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WHEELS FOR THE MIND

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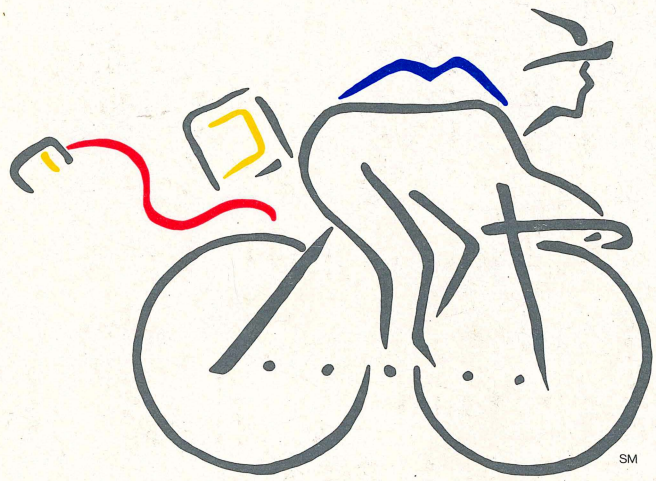

WHEELS FOR THE MIND

A SPECIAL OFFER

Welcome to *Wheels for the Mind,* the quarterly university publication devoted to one important goal—creative thinking through creative computing.

The information and ideas included in every issue of *Wheels for the Mind* speak for themselves. Please accept this sample with our compliments and take note that if you subscribe right now, you'll get 25% off the regular price. Your cost: only $12.

Just use the postage-paid reply card inside the back cover. At 25% off, it's like getting another quarterly issue free-in addition to the one you're holding now!

John Sculley
President and
Chief Executive Officer
Apple Computer, Inc.

Dear University Member:

You've taught us something.

At Apple, we've learned that serious professionals like you need a comprehensive source of information on computing developments.

As you know, many important developments come out of the nation's universities. After all, universities have traditionally been a seedbed for positive growth and change in society. It's no surprise, then, that in this age of rapid technological growth, universities should lead the advancement of academic computing.

The goal of Apple and the Apple University Consortium was to gather new ideas from many universities and organize them in an easy-to-read format.

That's what *Wheels for the Mind* is all about. It's a quarterly publication for students and faculty at colleges and universities. Its purpose is twofold: first to help you get the most benefit from your academic computing; and second, to assist universities in their role as innovators.

We invite you to try *Wheels for the Mind.* The introductory subscription price is just $12 per year-a 25% discount off the regular price. When you read through these pages, you'll find a wealth of ideas from educators, students, and other academic developers-ideas that will help your own personal computing goals.

Return your subscription card today. You'll not only save money, you'll stay on top of a fascinating new world.

Sincerely,

John Sculley

P.S. I hope you enjoy this free sample issue of *Wheels for the Mind,* a forum for ideas and developments that you won't find anywhere else. For a one-year subscription, simply return the order card inside the back cover. You'll automatically receive a 25% discount.

Wheels for the Mind

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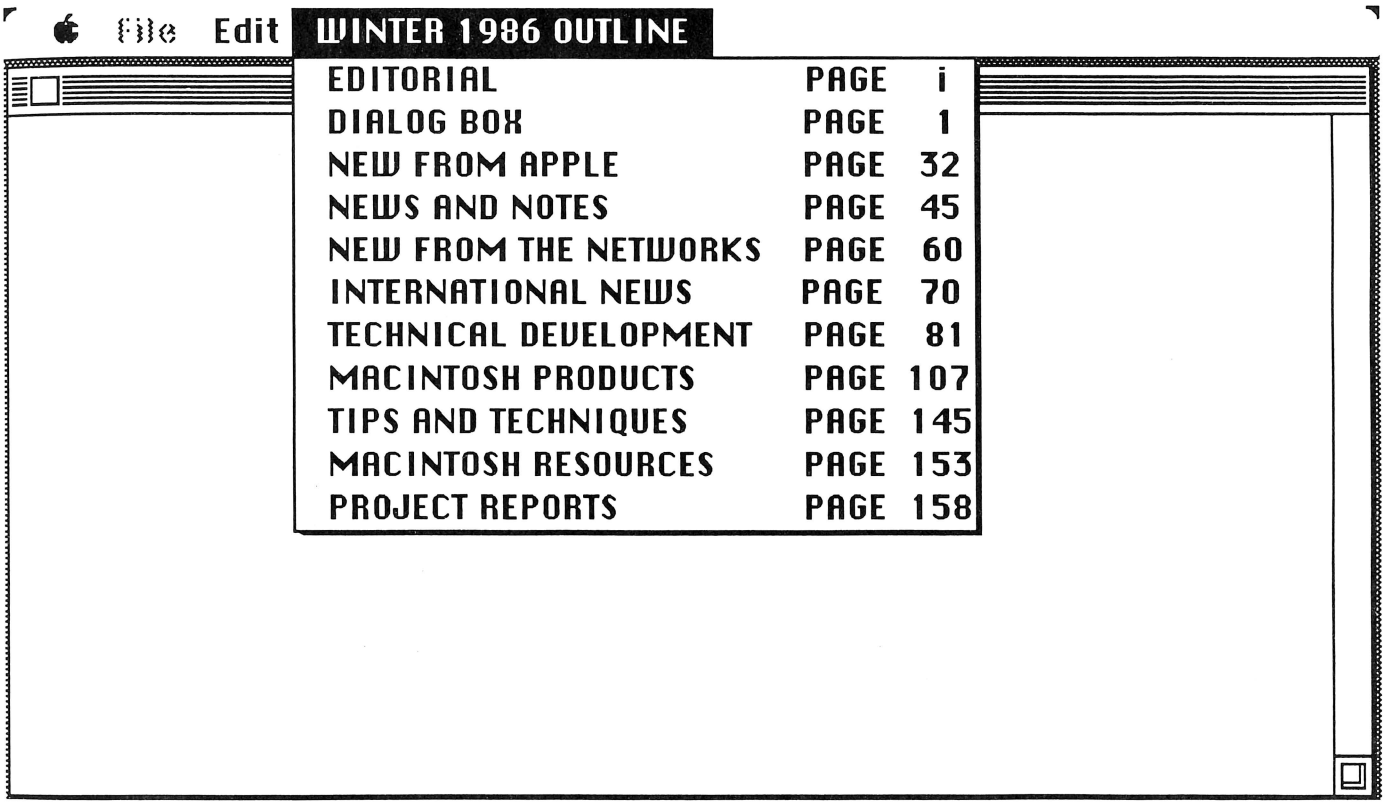

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Editorial

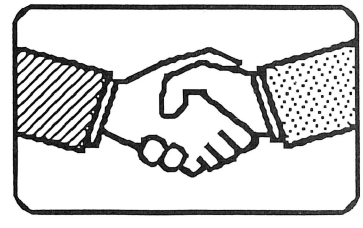
Winter 1986

Hello to both new and old friends. This is our winter issue and it coincides with some exciting announcements from Apple Computer, Inc. about their new products.

There are some features in this issue that I would like to call to your attention.

• Due to popular demand, the Tips and Techniques section has been renewed. This section will appear in future isues if there are enough new contributions to make it helpful to our readers. If you have a particular shortcut that you use with any software package (or with any hardware), please jot it down and send it in. You may save some of your colleagues a lot of time.

• **Wheels for the Mind** is traveling far and wide. Many international schools are referencing it often and there is even talk of developing a European counterpart.



• One of the original intents of this publication was to share information throughout the educational environment on new and exciting computer work that was in progress. I would like to now suggest another. In this issue, you will find a section in Dialog Box that asks about "Work Not Yet in Progress." The intent here is to present ideas that people have for great microcomputer applications. In this way, we might be able to stimulate joint development by bringing together people with similar interests. Perhaps we might even be able to provide pathways for contacting people with particular technical skills.
Please take a minute and jot down five ideas you have for great educational products (hardware or software). Send them along. Who knows? Maybe, just maybe, something really great may develop.

P.S. Let's hope that we can foster some international partnerships in this way.

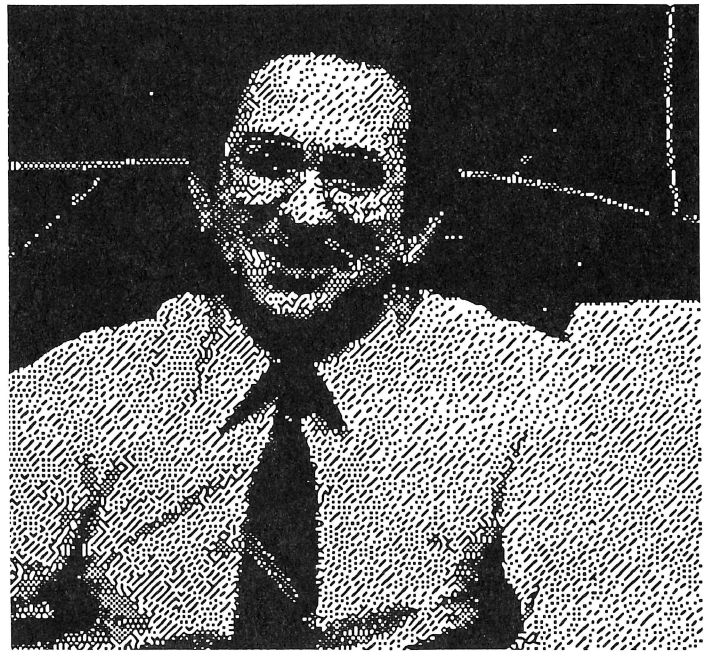
• There are some particularly interesting items in the News and Notes of Interest section. Be sure to take a close look at it.

If you wish to send along an article, project status report, or other submission, forward it to:

Peter Olivieri **BITNET :**
OLIVIERI@BCVAX3
Wheels for the Mind
Computer Sciences F430
Boston College
Chestnut Hill, MA 02167

Please try to send a disk with your words of wisdom, articles, applications, experiences, or software. Screen dumps are great, and you are encouraged to include them. All disks will be returned. Of course, you can also send along written material if you like. It's just that disks are easier to handle at this end.

The success of this publication depends a lot on the participation and support of all of you. Please contribute: Don't wait for someone else—do it yourself.



Dialog Box

The Dialog Box section will present articles on a wide variety of topics. They may include descriptions of local area networks, strategies for involving faculty in microcomputing, new course designs, outlines of seminars, suggestions for Apple Computer, Inc., or whatever you wish. Please participate. Write something for us and share it with our community of Macintosh™ users.

This Dialog Box includes information on the following:

Not Yet Work in Progress
Top 10 Educators' Applications
Literature: Hamlet on the Macintosh
Macintosh in Foreign Languages and Literature
A Bilingual Emphasis Program
Sample Course Outlines and Assignments
Drexel University Program
Liberal Arts Conference on Microcomputers

Here is the Dialog Box index.

NOT YET WORK IN PROGRESS

One of the most popular parts of *Wheels for the Mind* has been the section called "Work in Progress". Actually, this section is inappropriately named, because it contains information about work in progress *and* about completed work. Therefore, it has been renamed beginning with this issue.

It is quite likely that the section you are reading now (Not Yet Work in Progress) may become even more popular. But it will certainly take some participation on the part of all of the readers out there.

Have you got an idea for a great Macintosh application?

Here is the concept. Many of us have a lot of ideas residing somewhere in our gray matter that we would like to develop further. Sometimes we lack all of the expertise necessary, sometimes we want the opinions of others before we start, sometimes our "good idea" can be made into a "great" idea by a simple addition from another person.

Where else might you discover that a colleague in Japan is interested in sharing the task of developing an application you were considering?

Where else might you be able to make contact with someone who has the technical expertise (and the interest) to help you develop your ideas into an actual product?

It's a little bit like brainstorming on paper. Here's the challenge. Send the following information to **Wheels for the Mind,** (attn. Work Not Yet in Progress):

- Your name, address, telephone number, and work affiliation.

- Up to five areas in which you have some expertise that you are willing to share.

- Up to five areas that you are interested in pursuing, or at least talking about to someone.

I hope that in our spring issue, this will be one of the larger sections in this publication. Just think of it as a classified marketplace of ideas! I'll start it off.

Name:	Peter Olivieri
Address:	Boston College Computer Sciences, F-430 Chestnut Hill, MA 02167
Telephone:	(617) 552-3907
Affiliation:	Boston College faculty member

What are your areas of expertise?

Areas of Expertise:	Teaching Programming (variety of languages) Quantitative Analysis/MIS/Computer Science Videotape Production Writing

What are the areas you are interested in?

Idea/interest areas:	A Videodisc-to-Macintosh connection Expert systems in sports Multiperson Macintosh games

Well, that's a modest start. Let's see if we can get some responses from people at Consortium schools, non-Consortium schools, high schools, schools in Japan, European schools, and Australian schools—even from people who've dropped out of school.

TOP 10 EDUCATORS' APPLICATIONS.

Here is one person's "Top Ten"!

No fancy surveys here. No sales records were consulted. The validity of these selections is open to question. Nevertheless, here are some Macintosh applications that I feel are worthy of the attention of everyone interested in using the microcomputer in academic settings. Perhaps you have your own "Top 10." Send your list in. After a few issues, we're sure to have a representative sample of the best items to have in the "Educators' Microcomputer Applications Toolkit."

You can find additional information on these products in the Macintosh Products section of this issue.

The following programs appear in no particular order :

SLIDE SHOW MAGICIAN (Version 1.3) (Magnum Software)
This package provides you with the opportunity to present a "slide show" with your Macintosh. Slides can be brought to the screen with a variety of special effects, including sound. The progress of the show is under the control of the viewer. Slides can be created with MacPaint™, MacDraw™, ThunderScan, or similar packages. An excellent, easy-to use teaching tool.

SLIDE

MACWRITE™ (Apple Computer) or **MICROSOFT WORD** (Microsoft)
Is there a faculty person alive who does not write? Enough said! There's really no need to extoll the virtues of word processing for articles, working papers, textbooks, course notes, course outlines, class handouts, committee minutes, and so forth.

Word

MacWrite

THE PROFESSIONAL BIBLIOGRAPHIC SYSTEM (Personal Bibliographic Software, Inc.)
This is an excellent package that helps you to create and maintain bibliographies. It is indispensable for the professional writer. Bibliographic entries can be retrieved in a variety of useful ways. In addition, they can be printed in any format you wish (MLA, APA, customized, and more). A real timesaver.

MACPAINT and/or **MACDRAW** (Apple Computer)
Pictures are an important part of one's written work. They also can lend a touch of class to classroom presentations, or clear up a student's questions via a handout distributed in class. These two drawing tools are clear winners.

MacPaint

MacDraw

PAINT CUTTER (Silicon Beach Software)
One of the drawbacks with MacPaint (and some of the other drawing tools) is that you are not able to work with an entire picture at once. This application allows you to look at an entire drawing and select those portions of it that you like for transfer to another application. Saves a lot of time. Paint Cutter is part of Accessory Pak #1 from this vendor.

Paint Cutter™

SWITCHER (if you have a Macintosh 512K) (Apple Computer)
If you have a Macintosh 512K (or larger-capacity Macintosh), then you *must* get Switcher™. It allows you to switch instantly among several applications. Imagine being able to switch instantly between MacPaint and MacWrite, then MacWrite and MacDraw (with all three applications sharing a Clipboard). Switcher really works well. Imagine using it with a megabyte (a million characters) of main memory!

Switcher

THUNDERSCAN (for digitizing pictures) (Thunderware, Inc.)
This is a great hardware/software combination for taking existing artwork and having it digitized into a MacPaint document. For those of us who cannot draw and cannot find "just the right picture" among the commercial art disks, this is the answer. It's easy to use and does a great job. What more could you ask? Be careful, though, about digitizing pictures that belong to somebody else!

ThunderScan™

VideoWorks

VIDEOWORKS (just for fun) (Hayden Software Company, Inc.)
This is an excellent animation package that probably doesn't yet belong on this list. Precisely what it might best be used for in academia is, as yet, unclear. However, it is a great idea, with strong visual impact. Objects can be created and easily animated. Takes a bit of effort to get working with it (but a computer science degree is clearly *not* a requirement). Someone will do something great with this package.

Microsoft File

MICROSOFT FILE (Microsoft)
All faculty members keep records. These include grading records, promotion dossier information, bibliographies, publishing industry contacts, mailing lists, and on and on. Microsoft File is a strong, easy-to-use, flexible data base that's just right for the job.

Multiplan

MULTIPLAN (Microsoft)
The task of calculating student grades, particularly if the various exams and assignments are weighted differently, is a tedious task. If you used Multiplan only to handle this task, it still would be worthwhile. Of course, the spreadsheet can also be used for budgets, simple statistical analysis, financial planning, and more.

What applications, you ask, are likely to be popular soon? You can be sure that they will include "expert systems" packages and authoring systems. When an educator gets the proper tools, they become an extension of his or her talents. Then great things can be accomplished.

LITERATURE : HAMLET ON THE MACINTOSH.

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(503) 686-3911

The computer offers great opportunities to those in the arts.

The computer is a remarkably generous instrument, whose promise the humanist has been slow to recognize. A mathematician such as Seymour Papert quickly sees "an object to think with" that might make accessible to others his own deep love of mathematics. English professors, on the other hand, (with rare exceptions), see a cold puzzle with a grotesque appetite for numbers and draw back. A computer scientist such as Roger Schank takes "computer literacy" to mean an awareness of the discipline of programming and of the concepts that inform it, and speculates that computer literacy may become for today's students what the study of Latin and Greek was for an earlier generation. Those of us in the arts, even those of us who long for the return of a classical education, tend to see in computer literacy opportunities for low-level employment and a new bag of skills for secretaries to learn—and to shape our curricula accordingly.

Recently, I designed a course that tried to accept, in the very heart of the humanities as traditionally conceived, the challenge that Papert and Schank by their example offer the humanist. I wanted to make the computer "an object to think with" for my students—but about Shakespeare instead of math. I wanted the computer to convey the lesson that Coleridge learned from the "very severe master, the Reverend James Bowyer," who taught him Latin and Greek:

> *. . . that poetry, even that of the loftiest and, seemingly, hat of the wildest odes, had a logic of its own, as severe as that of science; and more difficult, because more subtle, more complex, and dependent on more and more fugitive causes (Biographia Literaria)*

The University was commited to a program of freshman seminars.

I was able to offer "Hamlet on the Macintosh" because of my university's commitment to a program of freshman seminars that allows senior staff to work closely for a quarter with small and varied groups of entering freshmen.

Perhaps the quickest way of describing the course I put together is simply to quote the brochure published by the university announcing freshman seminars for the 1985—86 academic year:

> TLN 7139 ENG 199 Hamlet on the Macintosh. 3 credit hours. A Freshman Seminar to be taught by Wm. Strange, English Dept., Fall 1985.
>
> A long look at a play worth all the attention we can give it and at some of the ways computers and the thought they prompt may sharpen our understanding of literature—and vice versa.

"Hamlet on the Macintosh" course announcement.

Our quarter's work will include the following tasks and topics:

I. GETTING TO KNOW HAMLET. We will be giving the play the first of many readings, sampling the commentary that has grown up around it, and adding to that commentary with the presentation and discussion of our first short paper on Hamlet.

II. GETTING TO KNOW COMPUTERS. The next several weeks will be spent in the Computer Center's Macintosh Laboratory picking up enough Pascal to be able to read and to modify simple programs. Our primer will be the suitably literary *Elementary Pascal; Learning to Program Your Computer in Pascal with Sherlock Holmes* by Henry Ledgard and Andrew Singer.

III. UNDERSTANDING PLOT. Still in the Macintosh laboratory we will fiddle around with some of the programs in Richard C. Vile's *Programming Your Own Adventure Games in Pascal* before presenting and discussing proposals for programming Hamlet as an adventure game. Those in the seminar who wish to do more than fiddle may take on additional reading in structuralist theories of plot and of plotting.

IV. UNDERSTANDING CHARACTER. These will be our last sessions in the Macintosh Laboratory. We will be reading and discussing selections from Margaret Boden's *Artificial Intelligence and Natural Man* and trying a few runs of that old standby "Eliza," before presenting and discussing proposals for turning "Eliza" into a soliloquy generating machine named "Prince Hamlet." In other words, we will be looking at character in literature as if it were a programmer's artifact.

V. UNDERSTANDING WHAT WE DO WHEN WE READ. We will bring our term's work to a close by considering, critically I hope, Roger Schank's short book *Reading and Understanding,* and by writing a second paper reconsidering Hamlet in the light of what we've learned together.
Such is the course I proposed to the university last spring. What I was able to do come fall proved somewhat different in detail (though not in expectation or intent).

Even before the quarter began, some changes had to be made. The cost of texts for the course was much too high. Our computing center could provide access to machines in its Macintosh laboratories, but students had to purchase their own software (Macintosh Pascal). Though Apple generously made a student package available at less than half the usual cost, a student still had to spend $40 before he or she even picked up the first book. For that reason Margaret Boden's excellent *Artificial Intelligence and Natural Man* was replaced by a single chapter on natural-language processing from John Krutch's *Experiments in Artificial Intelligence for Small Computers* and another chapter from Joseph Weizenbaum's *Computer Power and Human Reason.*

Other changes had to be made for other reasons as the quarter progressed.

"Alas, poor Pascal, I knew him well ..."

I planned the course on an Apple® II working through texts in Turbo Pascal as I considered them and assuming that when the Macintosh lab became available to me the combination of the Macintosh and Macintosh Pascal would make things even easier. What a mistake that was! But thereby hangs a tale (and several altered syllabi) too long to tell here.

The course succeeded beyond my wildest expectations.

Current Status: A full and careful evaluation of the project must wait upon its completion, but some things can be said now. We are within a week of the end of term, three of the four papers are in, and the course has succeeded beyond my wildest expectations. After getting enough Pascal to know what might be involved in modifying a skeleton program, we have talked and written about reworking a simple version of Joseph Weizenbaum's famous "Eliza" into a number of characters from Hamlet (Gertrude was the easiest). Playing with the notion of transforming Hamlet into an adventure game proved even more instructive. We started quite simply by using the convenient notation in Vile's book to work out a map of Elsinore with suitable puzzles and treasures. In the course of our discussions the questions grew gloriously. Can you map Hamlet geographically, or should you do it psychologically— producing not a floor plan but

something like a phrenologist's diagram of someone's head? Where and what is the maze in Hamlet—and *is* there one? Is there perhaps an Ophelia procedure in this play that astounds and disables those who invoke it? What are the goals of this game—win, draw, or Fortinbras?
I have been teaching Shakespeare for some 25 years; I have seldom seen students more on fire for a play, yet with such an exquisite sense of evidence informing their writing and their discussions. Further, the lessons learned have not stopped with Hamlet, as our consideration of Schank's work is making clear.

There are more things in heaven and earth than are dreamt of in many philosophies, and Hamlet on the Macintosh is teaching us what some of them are.

MACINTOSH IN FOREIGN LANGUAGES AND LITERATURE

Roland Specht Jarvis, Instructor for German
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Foreign Language Department, BH 228
St. Cloud, MN 56301
(612) 255-4141

The Macintosh had been on the market for almost six months when I decided to get rid of the old typewriter I had brought along when emigrating from West Germany in 1983. My job as a German instructor quite frequently requires producing dittos. Fortunately—as it subsequently turned out—this elderly typewriter would not hit the paper hard enough to produce an acceptable ditto imprint. American typewriters, on the other hand, usually do not feature the diacritical marks necessary for writing German. When I saw the first Macintosh using MacWrite 2.2, I realized that I had found the perfect tool, one that would give me all the goodies I needed for the production of German text. And at that time, almost 18 months ago now, I did not expect or demand anything more than a sophisticated typewriter.

When I first saw the Macintosh, I realized that I had found the perfect tool.

Along with the hardware—a Macintosh 128K, external floppy-disk drive, ImageWriter™, numeric keypad and a 300/1200-baud modem—I purchased MacWrite and MacPaint. During the summer, I learned how to use both programs, and how to incorporate the graphics I created into
word-processed documents.

When school started that September in 1984, you could see me proudly carrying my personal micro to my office in the morning and back home in the evening. I was, I think, the first Macintosh user on campus, at least among the faculty. My interest in our computer center on campus grew, and so did my disappointment when I found out that instructors and personnel in the computer department were intrinsically unwilling even to mention the name Macintosh. I was told that the Macintosh was a toy for grownups who wanted to dabble with computers. No software support, you know, incompatible, and far too many icons. The serious user, it was said, had (and has) to work

on an IBM or at least 100 percent compatible clones. But my dictionary could not enlighten me about the meaning of "compatible clone." And I kind of liked the icons, which gave me visual feedback about my work and the screen environment.

For a while, I felt trapped, alone with my mouse in a hostile blue-and-white world. On the other hand, what I could produce was far superior to earlier materials. And as time went by, some of my colleagues became interested in the machine. They decided that it was time to enhance our Chairman's writing in Russian and French, and bought a Macintosh 512K. (The fonts available for the Cyrillic alphabet are easily installed.)

I decided to write a German textbook.

About this time, I was asked to coauthor a German textbook. The original manuscript needed some serious revisions; and the publishers could give me only 100 days to rewrite it from scratch. Only the reading sections for which the copyrights were already purchased had to be maintained. At this point, I congratulated myself for having bought the Macintosh, and I started to write the book.

In February, I had purchased Microsoft Word, a nifty word-processing program with many advantages over MacWrite. My documents for the German textbook ran an average of 80K. I could have several windows open at the same time and cut and paste to my heart's content. The Word keyboard shortcuts remarkably reduced the use of the mouse. (I have since replaced the Apple-supplied mouse with a trackball mouse from Assimilation Process that works upside down.)

The work on the textbook revealed a deficiency in RAM memory, and I waited patiently for lengthy periods of time to repaginate documents; use MacPaint, MacDraw, and Word interactively; or change formats.

By this time, we had already upgraded my wife's Macintosh to 512K, and I was familiar with the resultant improvements. The use of a RAM-disk application made the system run very fast. We were able to install a 316K RAM disk that included a stripped system with 9- through 18-point Geneva as the default font (Microsoft Word's default font is New York).

I upgraded to a 1024K Macintosh !

Having experienced the advantages of a "FatMac" I decided to go one step further and upgrade from 128K to 1024K. I wanted to run larger RAM disks and create longer documents than usually possible when limited to the 399K of disk space on an empty, formatted 3.5-inch disk.

Can a floppy disk hold a document longer than 180K ?

To my knowledge, it is not possible to create documents longer than 180K on a regular floppy disk, because MacWrite and Word have to write the document twice on the same disk before you're finished with it. You always have the "final" document you're editing and an intermediate file that's simultaneously being created on your 400K disk to handle all changes before their incorporation in the final document. This is not an obvious problem when writing short 1- to 20-page documents, but it becomes one when you look at 250 pages. The German textbook now resides in only two documents on two physical disks. Each document is about 300K long. I copy it onto my 704K

RAM disk in order to make changes.

I find programs such as "Keyboard 0.1" helpful in customizing certain characters on the keyboard. I usually assign < [ ] \ { } | > German values, the characters ö, ü, ä, Ö, Ü, and Ä. It is also theoretically possible to create the layout of a German keyboard with this application.

Hayden Speller is useful when you need a list of all the German words you used in a text. When reading the document, this speller sorts out the German words, because they are not in the dictionary. Printing a list of these words provides you with the words used in the document. But there *is* one catch. Hayden Speller breaks words before umlauted characters (because you hit the Option key). At times, you have to guess which parts of the displayed list belong together. Also, this English/American speller doesn't provide you with cognates in your foreign-language word list, because they are acceptable in English and won't be displayed in the list of unknown words.

Hayden Speller is very useful.

This fall, I participated in a computer project sponsored by the Northwest Area Foundation. The project was intended to familiarize faculty with computers and their ability to supplement and/or enhance classroom instruction. Unlike other members of the project, I couldn't easily be persuaded that only IBMs and compatibles on the one side or Apple II on the other were the superior options because of software and hardware support. I have no programming skills and was unable to develop my own programs, so I looked for software that would allow me to tutor students using those applications I already knew how to handle.

I found a program called Slide Show Magician that would allow me to link screens that display information into a chain and to build in exercises and assignments. My third-quarter German class was to evaluate the program I created on a grammar topic. Using Word, Mac Paint, Mac Draw, Switcher and several commercially available disks with MacPaint documents, I made 26 screens and asked 30 students to view the show. A major drawback to using Slide Show Magician was the fact that students could not enter any data via the keyboard.

BILINGUAL EMPHASIS PROGRAM

Center for Community Development
Humboldt State University
Arcata, California

The Bilingual Emphasis Program is an exciting project that is teaching Indian languages to elementary school children. It started with a grant proposal written by Dr. Ruth Bennett, assistant director of the bilingual teacher training program administered by The Center for Community Development at Humboldt State University. Apple Computer responded with a grant of three Macintosh computers.

This program teaches Indian languages to elementary school children.

The goals of the Bilingual Emphasis Program are the following:

- To create a Unifon font, using the graphics capabilities of the Macintosh. The Unifon font will allow four languages—Yurok, Tolowa, Karuk, and Hupa— to be used with Macintosh.

- To create natural resource dictionaries in these languages.

- To produce curricula in these languages. Humboldt students working toward a multiple-subjects teaching credential (with a bilingual cultural emphasis in Indian languages) are using the Macintoshes to develop curricula for use in elementary schools in Pecwan, Hoopa, Happy Camp, and Crescent City, California.

Several scholars around the country were interested in the project.

Even before the Macintoshes arrived, Dr. Bennett began corresponding with scholars around the country who were interested in the project and who were willing to create "Unifonts." The Unifonts are sets of Unifon alphabet letters that were designed using FONTastic, a font-creation program by Altsys Corporation. Dr. Marc Cogan, of Wayne State University in Detroit, Michigan, contributed a "Unifont" that is further divided into four sets of Unifon characters, one for all the letters in the sound system for the Karuk, Yurok, Tolowa, and Hupa languages. Dr. Michael Connolly, of Boston College in Boston, Massachusetts, contributed a Unifont that contains all of the letter S's in one set of characters. (This is extremely useful with programs requiring a great deal of memory.)

After the Unifonts were created, they were matched with the Macintosh keyboard. International designations for typewriter keyboards were used to match each letter with a key. Next, they were named and saved to disk, along with a Font Mover. The disks were sent to Dr. Bennett who installed them on the program's MacWrite and MacPaint applications, under the Type menu.

Four projects are currently underway.

Four projects are currently underway in the Bilingual Emphasis Program using the Unifonts and Macintosh:

Hupa Natural Resources Dictionary

Hoopa Elementary School students (grades 5— 8) are participating in an Indian language resource class. The students create Hupa sentences, translate them into English and enter them into the Macintosh, using MacWrite. Hupa elders are available to help the students translate. The class is organized into small groups, each working on a different activity: Group I is creating a Macintosh computer dictionary; Group II is writing and spelling Hupa sentences; and Group III is reading Hupa and other Indian studies. Each week, students rotate groups so that everyone has an opportunity to use the Macintosh. Currently, there are 46 students enrolled in this class.

Yurok Natural Resources Dictionary

Students in grades 3—8 are learning how to type and print a bilingual dictionary. Every two weeks, students are selected to work directly

with Dr. Bennett and the Macintosh in design, typing, and graphics. Not only are the students having a lot of fun exploring graphics with MacPaint, but serious work is done with teacher Georgiana Trull, on creating and translating Yurok sentences into English. These sentences will then serve as definitions of terms for the dictionary. So far, 27 students have taken part in this project.

Karuk Acorn Book

With the Macintosh, it has become possible for a class to gather and assemble information quickly and effectively. One class has already begun to prepare a new book. Information was collected from several sources and organized using FileVision as an electronic filing-system. Facts were organized under topics, which will become chapters for the book:

I. Preparing the Acorns: Gathering, Storing, Cracking and Grinding, and Leaching.

II. Cooking Acorn Soup

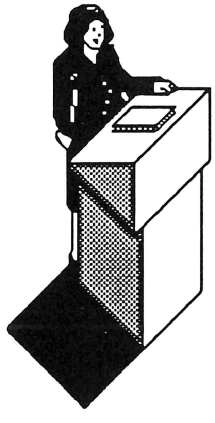
Illustrations will also be included.

Yurok Myth Project

Georgiana Trull and Charley Burns, teachers in the Bilingual Emphasis Program, have completed an important phase of a Yurok myth project. The project will be published by the Bilingual Emphasis Program.

The project involves a translation process during which the myth was told by Trull in the Yurok language, translated literally into English, and then made into well-formed sentences in both Yurok and English. An extended version of the myth will be published in the spring.

For more information on these fascinating projects, contact The Center for Community Development, Arcata, California; (707) 826-3711.



COURSE OUTLINES.

Many requests have come in from Macintosh users in the academic community who are interested in seeing how their colleagues have integrated the microcomputer into their classroom activities. The next section will present a few course descriptions and outlines that illustrate how some faculty members have accomplished this.

Outline 1: Introduction to Computers

The following outline is used in a one-semester course called "Computers for Management." It is a required course in a School of Management and has 16 sections that serve approximately 800 students per academic year (two semesters). The intent of the course is to provide students with computer skills that might be helpful to them in other academic courses. It is assumed that these students have not had any prior computing courses. Generally, this course is given in the sophomore year (although there is currently some pressure to move it to the freshman year).

In some cases, material is covered that is not in the course textbook. Students are encouraged to take notes during these times. The choice of a text was, and still is, a difficult one because of the wide variety of topics covered. The text has been different each of the last three semesters.

The course has been very well received by students.

The course has been well received and has clearly had an impact on other courses in the university curriculum. Students, many of whom would not have considered using a computer in certain courses, now use the Macintosh quite routinely.

What follows is an outline from a recent implementation of this course and a few sample assignments.

MC021 COMPUTERS FOR MANAGEMENT

INSTRUCTOR: Dr. Mark Papers
N.E. Building
Extension 3907

OFFICE HOURS: Monday, Wednesday & Friday 11-1
Wednesday at 3
Other times by appointment

Feel free to drop in at other times, if I am busy I will ask you to come back. If necessary, you can make an appointment with me for some other more convenient time.

There will be one or more written assignments due each and every week. Unless specifically mentioned, assignments are due on Monday. PLAN AHEAD. DO NOT WAIT UNTIL THE LAST MINUTE.

There are now several textbooks available that are suitable.

TEXTBOOK REQUIRED: William Skyvington, Mastering Your Macintosh

Late assignments will not be accepted.

WEEK 1: September 2 - 6

The course includes...

Wednesday Sept. 4: Introduction to the MACINTOSH and the course.

Friday Sept. 6: Using the MACINTOSH: Introduction to Word Processing and MACWRITE.

MacWrite

ASSIGNMENT: Sometime before next Wednesday, visit the Microcomputer Laboratory and complete **Assignment Number 1**; you should also plan on buying 2 disks for your own personal use from the Computer Store or another student.

READING: Introduction; Chapter 1, Chapter 2, Chapter 3, and Chapter 4 (It's a lot, but it will help; there will be less reading later.)

WEEK 2: September 9 - 13

MacPaint

TOPICS: MACWRITE continued; Introduction to MACPAINT
READING: Chapter 5 and Chapter 6
ASSIGNMENT: Number 2: Due next Monday (9/16)

WEEK 3: September 16 - 20
TOPICS: Using a Spreadsheet Part 1 (MULTIPLAN)
READING: Chapter 8
ASSIGNMENT: Number 3: Due next Monday (9/23)

WEEK 4: September 23 - 27

Multiplan

TOPICS: Using a Spreadsheet Part 2 (MULTIPLAN)
READING: Chapter 8
ASSIGNMENT: Number 4: Due next Monday (9/30)

WEEK 5: September 30 - October 4
TOPICS: Using a Spreadsheet Part 3 (MULTIPLAN)
READING: Chapter 8
ASSIGNMENT: Number 5: Due next Monday (10/7)

WEEK 6: October 7 - 11
TOPICS: First Examination will be held on Monday *AND* Wednesday (100 minutes)
Exam will be gone over in detail on Friday
READING: None; Prepare for Examination
ASSIGNMENT: None

Chart

WEEK 7: October 14 - 18
Monday is a school holiday - no classes.
TOPICS: Computer Graphics (MICROSOFT CHART)
READING: Chapter 9
ASSIGNMENT: Number 6: Due next WEDNESDAY (10/23)

WEEK 8: October 21 - 25

File

TOPICS: Data Base Management Part 1 (MICROSOFT FILE)
READING: Class Notes
ASSIGNMENT: Number 7: Due next Monday (10/28)

BASIC

WEEK 9: October 28 - November 1
TOPICS: Data Base Management Systems Part 2 (MICROSOFT FILE)
READING: Class Notes
ASSIGNMENT: Number 8: Due next Monday (11/4)

WEEK 10: November 4 - 8
TOPICS: Introduction to Programming Part 1 (MICROSOFT BASIC)
READING: Class Notes
ASSIGNMENT: Number 9: Due next WEDNESDAY (11/13)

WEEK 11: November 11 - 15
Monday is a school holiday - no classes.
TOPICS: Second Examination will be held on Wednesday *AND* Friday (100 minutes)
READING: None; Prepare for Examination (everything since last exam).
ASSIGNMENT: None

WEEK 12: November 18 - 22
TOPICS: Introduction to Programming in BASIC Part 2 (MICROSOFT BASIC)
READING: Class Notes
ASSIGNMENT: Number 10: Due next Monday (11/25)

WEEK 13: November 25 - 27
(THANKSGIVING HOLIDAY ON WEDNESDAY AND FRIDAY)
TOPICS: Special Software Day (we'll be demonstrating some special game/arcade software with class participation and a discussion on how they were designed).
READING: None
ASSIGNMENT: None

WEEK 14: December 2 - 6
TOPICS: Introduction to Programming in BASIC Part 3 (MICROSOFT BASIC)
READING: Class Notes
ASSIGNMENT: Number 11: Due next Monday (12/9)

WEEK 15: December 9 - 13
Last week of classes (class will meet only on Monday)
TOPICS: Course wrapup, summary, final exam comments etc.
READING: None
ASSIGNMENT: None

General grading in course:

Examinations

25 %	**(Exam 1)**
25 %	**(Exam 2)**
40 %	**Final Exam (a cumulative examination)**
10 %	**(Computer Assignments)**

MC021 Selected Semester Assignments

Weekly assignments using the Macintosh are required.

Number 1

Go to the **Macintosh Lab** located in the Library complex.

Ask the User Assistant on duty for a Macintosh disk that contains **MacWrite**.

Place your right thumb on the disk label and insert it into the disk drive opening in the computer. Turn on the machine (the switch is at the right rear of the machine).

First timers learn the "user interface".

If the disk "icon" does not immediately open, use the mouse to move the arrow on top of the disk icon and **DOUBLE-CLICK** (press the mouse button twice). This will display what is on that disk.

Move the window by pointing to the label on top of the window, hold the mouse button down, and **drag** it to a new location. Let the button go in its new position. Practice this for a while.

Shrink the window by pointing at the bottom right corner of the window, holding down the button, and dragging. Let the button go. Make the window as large as the screen. Make it very small. Make it a size that allows you to see all the icons in the window.

Move some of the icons around. (Point at them, hold the button down, and drag them around. Let the button up at their new position.)

Open up the **CALCULATOR** by pointing to the **APPLE ICON** on the menu bar, holding the mouse button down, dragging down until the word CALCULATOR turns black, and then letting the mouse button up. Move the calculator around. Operate the calculator with the mouse (point and click). Operate the calculator with the keyboard.

Open the **PUZZLE** desk accessory. Try to solve the puzzle.

Open the **ALARM CLOCK**. Make sure the date and time are correct.

Open the **NOTEPAD**. On page 3 of the notepad, write your name, your section, your instructor's name, and the time the class meets.

Rearrange the objects on the desk so that they all can be seen.

Print what is on the screen. Make sure that the printer is switched to your machine (and that your neighbor is not printing anything). Hold down the **SHIFT KEY**....hold down the **COMMAND KEY** (the cloverleaf). Press the **4** key. Let all keys up. ***Hand in the resulting piece of paper***.

Close all of the objects by clicking in the upper left corner of each.

When you only have a picture of the disk icon remaining on the screen, **EJECT** your disk (look through the menus for the appropriate selection).

Turn off the computer and return the disk to the User Assistant.

Objectives of the first session.

At the end of this lesson, you should be familiar with:

How to open up a window.

How to resize a window.
How to use a desk accessory.

How to "put items away" (close them).
How to use menus.

The effects of a single click.
The effects of a double-click.

The concept of pointing.
The concept of dragging.
How to move a window (or any other object on the screen).
How to start up and shut off the Macintosh.

Number 2

Students love using MacWrite.

Write a two-page essay, using MacWrite, describing yourself, your background, your interests, your feelings about computers, your hopes or fears, your academic program, or whatever. Your essay should be double spaced, right justified, and incorporate a header and footer. Try to use some different fonts and styles to emphasize parts of your essay.

Number 3 Graphics

The following assignment should be done using the MICROSOFT CHART software package. It would be prudent to gather the data first, plan the design of your graph, and then use the microcomputer.

This assignment is due on Wednesday October 30th (10 days).

Graphics are high on the charts !

Hand in the following graphs. In all cases, **ACTUAL DATA SHOULD BE USED**. You may need to do some library research to find the appropriate information.

ASSIGNMENT: YOU MUST SOLVE **BOTH** NUMBER 1 AND NUMBER 2 **AND** THEN CHOOSE ONE MORE FROM THE REMAINING THREE.

DO BOTH OF THESE

Choose examples that are interesting to the students.

1. Create a column chart (or bar chart) that displays the number of male undergraduate students and the number of female undergraduate students enrolled at this University from 1975 to 1985.

2. Select three stocks of your choice from some recent issues of the Wall Street Journal. Plot the performance of each stock (its price) over a recent two-week period. Display all of this information on the same line graph.

AND ALSO DO ONE OF THESE

A. Submit a graph that shows the relationship between traffic accidents and the age of the driver (including information on alcohol-related accidents would be a plus).

B. Submit a graph that displays the growth in tuition here versus the tuition at several other similar institutions. Select a suitable time period.

C. Create an original graph that depicts some relationship of interest to you (either personally or as a part of your academic program). It will be evaluated both for content and for appropriateness. Remember, actual data should be used.

Often, students choose to draw an original graph.

Outline 2: Faculty Orientation to Computers

In addition to preparing students to use this wonderful new resource effectively, most colleges and universities must also provide programs to train the faculty and staff. This is particularly important for those who have had little or no introduction to the computer. The following outline suggests one way to begin to acquaint faculty with the possible uses of the Macintosh. Note that it was a one-day session (given at the end of each academic term) that included lunch and actual "hands-on" use of the computer. Additional sessions followed, including options for learning all about spreadsheets, and graphics, how to make slides, and much more.

Many faculty members will need to have an orientation to the Macintosh.

FACULTY ORIENTATION: PART 1 - INTRODUCING THE MACINTOSH

9:00 - 10:30	LECTURE : USING THE MACINTOSH INTRODUCTION TO MACPAINT
10:30 - 12:00	LABORATORY EXERCISES (MICROLAB)
12:00 - 1:00	LUNCH
1:00 - 2:15	DEMONSTRATION: "MIND PROBER" INTRODUCTION TO WORD PROCESSING
2:15 - 3:30	LABORATORY EXERCISES (MICROLAB)
3:30 - 4:00	DEMONSTRATIONS:

CHESS (SARGON III)
SLIDE SHOWS (SLIDE SHOW MAGICIAN)
PICTURES (THUNDERSCAN)
A MAC THAT TALKS (SMOOTHTALKER)
THE MUSICAL MAC (MUSICWORKS)
A PICTORIAL DATA BASE (FILEVISION)
MACINTOSH HARDWARE.

It is important to demonstrate a lot of different applications to faculty.

Some sample handouts for the Faculty Sessions follow.

The session begins with the desktop and the desk accessories.

THE MACINTOSH DESKTOP.

- ICONS.
- TRASH CAN.
- MENUS.
- WINDOWS.

USING THE MOUSE.

- POINTING.
- LIFTING THE MOUSE.
- CLICKING.
- DOUBLE-CLICKING.
- DRAGGING.

DESK ACCESSORIES.

- ALARM CLOCK.
- NOTE PAD.
- SCRAPBOOK.
- CALCULATOR.
- KEY CAPS.
- PUZZLE.
- CONTROL PANEL.

MENUS.

- APPLE MENU GIVES ACCESS TO DESK ACCESSORIES.
- FILE MENU USED FOR SAVING, PRINTING, ETC.
- EDIT MENU ALLOWS CUTTING, PASTING, AND COPYING.
- VIEW MENU LOOKS AT FILES IN DIFFERENT WAYS.
- SPECIAL MENU CLEANS UP THE DESKTOP.

- (NOTE BLACK AND GRAY ITEMS ON DESKTOP AND MENU)

Part of the session concerns how to use disks.

DISK USE.

- INITIALIZING.
- COPYING FILES.
- COPYING DISKS.
- TRASHING FILES.
- USING FOLDERS.

PRINTING QUICKLY.

- CAPS LOCK-CLOVER(OPTION)-SHIFT-4
- CLOVER(OPTION)-SHIFT-4

MacPaint is excellent for "showing off" the Macintosh !

MACPAINT.

STARTING UP.

USING THE TOOLS.

- PENCIL.

ERASER.
PAINTBRUSH.
CHANGING PAINTBRUSH (DOUBLE-CLICK)
SELECTING A PATTERN (CLICK ON IT)
DRAWING RECTANGLES, CIRCLES, LINES.
DRAWING FILLED AREAS.
USING THE PAINTBUCKET.
THE SPRAY CAN.
ENTERING TEXT (USE THE LETTER "A" ICON TEXT TOOL).
UNDO WILL UNDO MISTAKES (ONLY THE LAST ACTION TAKEN).
CUTTING AND PASTING (USING THE CLIPBOARD).
THE LASSO, THE MARQUEE (SELECTION RECTANGLE).
COPYING.
INVERTING, ROTATING, ETC.
THE HAND (GRABS THE PAPER).
SEEING THE WHOLE PAGE.

SPECIALTIES.

FAT BITS.
MIRRORS (INVERSION).

MACWRITE.

THE IDEA OF WORD PROCESSING.

ENTERING TEXT.

TYPING.
THE CURSOR (OR INSERTION POINT).
WHEN TO USE RETURN.
AUTOMATIC WORD WRAP.
SELECTING TEXT.
CHANGING FONTS.
CHANGING STYLES.
CHANGING SIZES.

CORRECTING MISTAKES.

USING THE BACKSPACE KEY. (PLACE CURSOR AND PRESS

BACKSPACE)
INSERTING TEXT. (PLACE CURSOR AND TYPE)
REPLACING TEXT. (SELECT AND RETYPE)
DELETE TEXT (SELECT AND PRESS BACKSPACE).

SAVING AND RECALLING.

RULERS.

CHANGING MARGINS.
JUSTIFICATION.
TABS.
DECIMAL TABS.

Most faculty members are very interested in word processing.

Faculty need to have direct hands-on experience with the Macintosh.

HEADERS AND FOOTERS.
SEARCH AND REPLACE.

ASSIGNMENTS :

MORNING SESSION.

1. START UP THE MACINTOSH USING THE SYSTEM DISK.

2. OPEN THE DISK UP SO THAT A WINDOW OF ITS CONTENTS APPEARS ON THE SCREEN.

3. OPEN THE CALCULATOR. DO SOME CALCULATIONS. MOVE THE CALCULATOR AROUND. OPEN THE NOTEPAD. ENTER SOME TEXT ON PAGE 3 OF THE NOTEPAD. OPEN THE PUZZLE. TRY TO SOLVE IT.

4. PUT THE CALCULATOR, NOTEPAD, AND PUZZLE AWAY.

5. INSERT YOUR BLANK DISK IN THE SECOND DISK DRIVE AND INITIALIZE THAT DISK.

6. OPEN UP YOUR DISK ICON (SO A WINDOW SHOWS). ARRANGE THE TWO WINDOWS ON YOUR DESK SO THAT YOU CAN SEE WHAT IS IN BOTH OF THEM.

7. COPY THE SYSTEM FOLDER ONTO YOUR DISK.

8. WHEN YOU SEE HOW EASY THIS IS, PUT THE COPY OF THE SYSTEM FOLDER THAT YOU JUST MADE INTO THE TRASH. (YOU WILL NEED THE ROOM LATER) EMPTY THE TRASH.

9. EJECT BOTH DISKS. SHUT OFF THE MACINTOSH.

10. INSERT MACPAINT IN THE INTERNAL DRIVE AND YOUR OWN DISK IN THE EXTERNAL DRIVE.

11. OPEN UP THE MACPAINT ICON (IF IT ISN'T ALREADY). DOUBLE-CLICK ON THE MACPAINT FILE TO RUN THIS APPLICATION.

12. CREATE A PICTURE IN MACPAINT. IT SHOULD HAVE THE FOLLOWING:

A. YOUR UNIVERSITY IN BIG LETTERS AT THE TOP OF THE PAGE (IN LONDON FONT).

B. A COPY OF THE ROBOT (FOUND IN THE SCRAPBOOK).

C. 4 SIGNS OF YOUR OWN DESIGN THAT TELL SOMETHING ABOUT YOUR SCHOOL.

D. PRINT YOUR WORK OF ART.

AFTERNOON SESSION:

USE MACWRITE TO WRITE A TWO-PAGE COMPARISON OF USING A TYPEWRITER TO USING A MACINTOSH TO PREPARE A PAPER OR REPORT. YOU SHOULD INCLUDE HEADERS AND FOOTERS. USE DIFFERENT TYPE STYLES, SIZES, AND FONTS TO SHOW YOUR KNOWLEDGE OF THESE TOOLS.

IF YOU PREFER, YOU MAY WRITE A TWO-PAGE LETTER TO THE DEAN SUGGESTING YOUR REASONS FOR SUPPORTING A POLICY OF REDUCED LOADS AND INCREASED INCREMENTS FOR FACULTY.

The faculty orientation ends with a word processing assignment.

Drexel University: Not Just Software!

The Microcomputing Program at Drexel University is nearing the end of its third year, with 60 percent of the student body owning Macintoshes. Since the program's inception, the Office of Computing Services has supported student and faculty Macintosh use through classroom and public cluster facilities, consulting, workshops, and newsletters.

A staff of about 60 full-time professionals and part-time and full-time student employees provide walk-in and phone consulting. Over the last three years, we've found that phone consulting is a valuable service, but it is not used as much as we expected. Students tend to ask other students for help in solving Macintosh problems before calling the Macintosh hotline. One rather unconventional service of the consulting group is the "MacPaint Gallery," a wall devoted to works done by students using MacPaint.

Drexel has approximately 100 Macintoshes and 50 printers available for public access. One major cluster of 30 Macintoshes, 16 of which are connected to printers, serves an average of 1,000 students per week. Two Macintosh classrooms, open to all departments, are used whenever an instructor needs a "class set" of Macintoshes, or telecommunications capabilities. The Office of Computing Services offers a series of 10 one-hour workshops in one of the classrooms every term.

Drexel has 100 Macintoshes available for public access.

Printed Macintosh information is disseminated through two newsletters: *Update* (the monthly Computing Services newsletter) and *boot* (the weekly faculty newsletter). A series of hints, tips, short procedures, and articles for the Macintosh is also on reserve at the library.

Computers for the Liberal Arts

Reed College, Portland, Oregon
7, 8, 9 November 1985

Representatives from 48 Liberal Arts institutions attended the conference.

The Computers for the Liberal Arts conference, held at Reed College November 7, 8, and 9, 1985, was an academic conference designed to explore the computing concerns of liberal arts institutions. The conference, which was generously supported by Apple Computer, was attended by representatives from 48 liberal arts colleges, including Bryn Mawr, Carelton, Davidson, Franklin & Marshall, Middlebury, Pomona, St. John's, Smith and Williams. Conference speakers, who form an impressive list of representitives from academia and industry, addressed educational topics ranging from the diverse fields of humanities and sciences to engineering and industrial perceptions of academic computing.

Unlike many computer-related professional meetings, where the emphasis is placed on the technology itself and academic questions are almost an afterthought, the Reed conference sought to make discussion of fundamental issues of liberal arts education the primary objective. What are the most effective academic computing applications? What are the real costs, and when are they appropriate? How is liberal arts teaching methodology changing, and should it be changing in the first place? How can institutions cooperate? What will college campuses look like in the future -- will there be a computer in every room?

The conference began with an overview of the Macintosh.

Day one of the Computers for the Liberal Arts conference featured demonstrations of academic computing with the Macintosh and a hands-on room where conferees could examine software developed at AUC schools and discuss computer-related questions with Apple staff. The demonstration room featured representitives from both commerical concerns and academic institutions that have been active in developing academic software for the Mac.

Reed's plan includes a campus-wide computer network.

Educational and administrative concerns associated with academic computing were the focus of the second days' discussions. After brief opening remarks, Professor Richard Crandall, Technology Plan Director, presented an *"Overview of the Reed Master Plan for Computing Resources."* Key elements of Reeds' technological activities include a campus-wide network, a plan to loan Macintoshes to students at zero-net-cost, and academic software developments such as Rascal (a new computer language for the Mac), scientific laboratory systems (BenchTop systems), and a color graphics interface for the Mac.

Marvin Levich, Professor of Philosohpy at Reed College spoke next on *"The Role, if Any, of Computer Technology in Liberal Education."* Professor Levich argued that before we accept the computer revolution as an educational panacea, we must clarify the distinction between education, which is the job of liberal arts institutions, and training,

which is not. In addition, we must thoroughly examine the rationale for using computers as educational tools instead of rashly accepting the computer industry's pronouncement that "computers are the answer."

Dr. Theodore Crovello, Visiting Scholar at the Stanford University School of Education, followed with a discussion of the many ways in which computers can be effectively used in higher education. In many cases, for example, computer assisted instruction can be used to teach a highly complex subject matter that could previously only be taught at a graduate level.

How can computers be used in higher education?

Breakout Sessions gave conference attendees the opportunity to participate in small discussion groups on specific subjects. Topics for the breakout sessions included administrative and financial strategies for integrating computers into higher education, computers and writing, academic software development for the Mac, and institutional cooperation.

The final speaker for the day was Philip A. Bushby, Academic Program Director of the College of Veterinary Medicine at Mississippi State University. Dr. Bushby's main point was that using computers simply to continue teaching the way we have always taught is not their most effective use: these methods will not help us cope with the "knowledge explosion." Rather, computers can best be used as Expert Systems, to store and retrieve masses of factual information that form the core of knowledge of a particular field, thus freeing a student's time for learning concepts and critical thought.

Computers can best be used as "Expert Systems".

The Technology Faire gave participants a chance to see a variety of Macintosh applications *in situ.* Examples of developments displayed at Tech Faire are a NMR spectroscopy system, a human psychophysiology laboratory for measuring and recording human brain activity, LaserTerminal -- a program for printing VAX mainframe output on the LaserWriter, LINEAC -- a computer-controlled energy system, and ColorPaint -- a color graphics interface for the Mac. Many Macintosh projects at Reed were developed by students as part of the work for their senior thesis. Others have grown out of collaborative faculty/student research programs.

Demonstrations were given at the Technology Faire.

The final day of the Computers for the Liberal Arts conference was devoted primarily to speakers from the computer industry. Bud Colligan, University Marketing Manager at Apple Computer, discussed the importance of computers in higher education and Apple's committment to educational computing. Feedback from educators has indicated that much of the popularity of the Apple][family is due to its open architecture, and this has influenced Apple's decision to come out with an open architecture Mac. Next, Burt Cummings, University Programs Manager at Apple, discussed Apples' intentions to start a new educational purchase plan in early 1986. The new plan, called Ahead, will be similar to the existing University Purchase Plan except sales and support will be handled through dealers.

Bud Colligan spoke about Apple's commitment to education.

Bill Gates discussed the future impact of computers.

Bill Gates, Chairman of the Board, Microsoft Corporation spoke next on software and hardware developments that he feels will significantly affect education. The three most far-reaching technological advancements are high-quality graphics, which will improve the flexibility and useability of computers; networking, which, on a large scale, can dramatically improve communication and information access; and CD ROM compact disk systems, which have 1000 times the storage capacity of floppy disks. In addition, Gates stated that changes from one generation of computers to the next will be much less abrupt than they have been in the past, thus significantly reducing the costs to educational institutions of modernizing equipment.

David Plumer, Senior Corporate Consultant at Digital Equipment Corporation, discussed the implications of large-scale computer systems for educational institutions. Cooperative Computing, as he terms it, involves a high-speed network which accesses many different kinds of devices. These devices work together much the same way people do: they each work in a relatively specialized area -- when the project gets more complex a greater variety of devices must be added to the group. Plumer stressed that the technology for these large systems already exists and within the next couple of years they will begin to be in the price range of the average educational institution.

The panel discussion which followed gave attendees a chance to talk about computer-related issues which commonly affect liberal arts institutions. Discussion centered around topics such as establishing communication and cooperation among liberal arts colleges, educating students about software piracy, how to promote software development for the humanities, when it is appropriate to develop new software and when it is best to try creative applications of commercial software, and how to effectively evaluate the impact of computers on college campuses

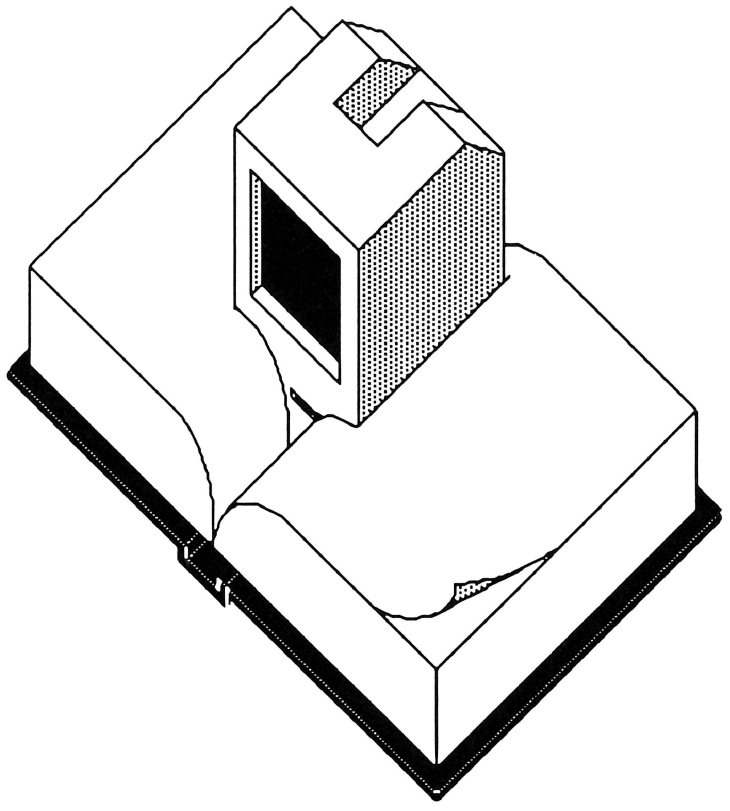
The Conference closed with a keynote address by Dr. Neal Lane, Chancellor of University of Colorado at Colorado Springs and Chairman, National Science Foundation Advisory Committee on Advance Scientific Computing. Dr. Lane first talked about the history of large-scale computing in the U.S. and went on to discuss NSF contributions to super computing and efforts to make funds available to researchers and scholars who need access to the sheer computational power of supercomputers.

This conference was a first step ...

Computers for the Liberal Arts was the first step in creating an academic forum where liberal arts educators could discuss general issues related to computers in education, as well as the specific concerns of liberal arts colleges. Many liberal arts institutions have recognized the need to start integrating computers into their campuses, though the risks and costs can seem inordinately high -- especially for small, tuition-dependent schools that do not typically garner either the visibility or funding available to large universities. Through the generous support of Apple Computer, we are planning to establish this meeting of liberal arts institutions as an annual event: next year's conference will be held on the east coast, possibly at either Colby College or Washington College.

Proceedings of *Computers for the Liberal Arts* will be available in early 1986 -- contact Marianne Colgrove, Education & Documentation Coordinator, Development Lab, Reed College, Portland, OR 97202, (503) 771-1112, ext. 277 for details.

Be sure to send for the Proceedings.



A book and a Macintosh ....an educatior's toolbox.

A Brief Survey

Please take a few minutes to send us the following information, we will report the results back to you in our next isue.

1. List your five favorite Macintosh software packages.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

2. What state are you from ? _____

3. What is your age? _____

4. Are you male or female? _____

5. Where is the Macintosh that you use located (i.e. home, work, school)?

   _____

6. What size Macintosh do you own? _____

7. Circle the most appropriate item for your current status :

   Elementary School Student

   High School Student

   High School Graduate

   College Student (Year _____)

   College Graduate

   Graduate School Student

   Graduate School Graduate (Degree _____)

   Other _____

8. List five items you would like to see as part of the 1990 Macintosh.

Using Animation to Teach Compiler Construction

Thomas A. Standish and Anil S. Bajaj
Computer Science Department
University of California
Irvine, California 92717

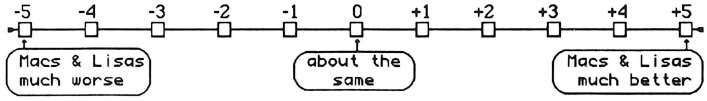
ArpaNet: Standish@UCI

Can animation help teach computer science?

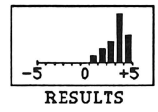
Summary

We have developed some fresh evidence which suggests that animation can be used beneficially to teach computer science.

Twenty seniors at UC Irvine recently completed a compiler construction course using Macintoshes and Macintosh XLs (Lisas). In an opinion survey, these students unanimously rated the Macintosh/Lisa programming environment as better than the best previous computer/environment they had used. (Previously, 71% of the students had used DEC-10s, 12% had used DEC-20s, 53% had used VAXes, 47% had used PDP-11s, 47% had used Sigma-7s, 59% had used IBM PC clones, and 18% had used Teraks.)



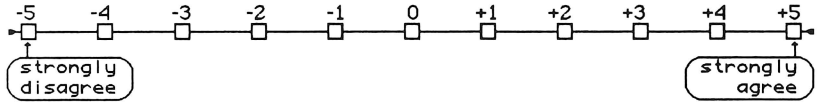
Compare the Macintosh/Lisa programming environment with best of the others you have used.



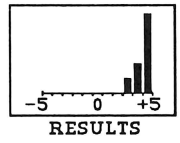
Macintoshes preferred unanimously to other computing environments.

Significantly, they also strongly agreed with two statements:
(1) animation helped them understand how compilers work, and
(2) animation helped them debug the compilers they wrote themselves for the course project.

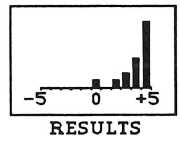
Using a scale of −5 to +5, rate your agreement or disagreement with the statements below.



Statement 1: Animation helped me understand the SmallGol compiler.



Statement 2: Animation helped me debug my own compiler.



Students concluded animation helped both understanding and debugging.

Surviving the killer course.

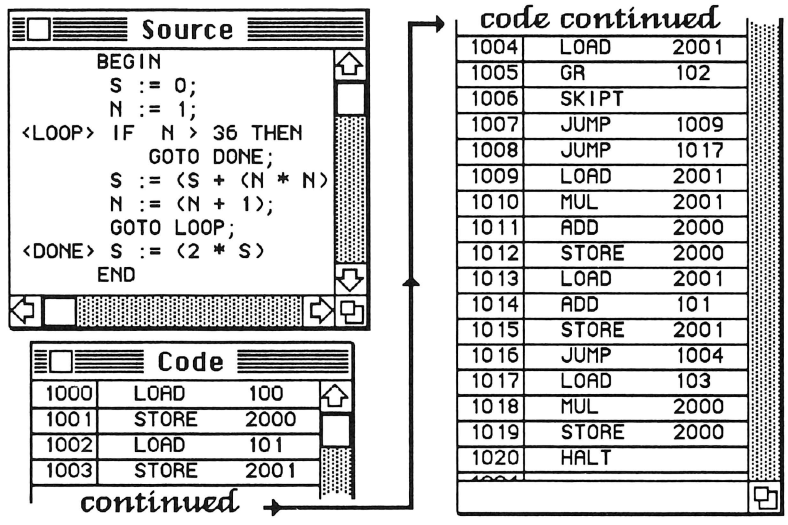
The compiler construction course (ICS 145) has the reputation of being a "killer course" at UC Irvine. In the past, many students have had to spend "all-nighters" during exam week in the computer room in order to finish their compilers. But this time, things were different. Using the Macs and Lisas, all students finished before exam week began (even though the subject material was identical to that covered in previous years).

Given these results, our enthusiasm is running high. We'd like to share some of the details of our approach with you.

SmallGol — An Animated Educational Compiler

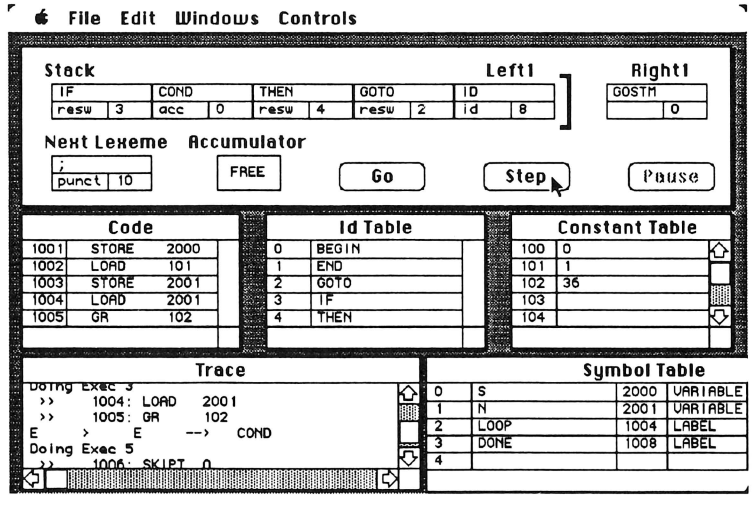
SmallGol — an Animated Educational Compiler.

SmallGol animates the operation of a compiler for a tiny programming language. The following is an example of a SmallGol source program and the code SmallGol produces for it.

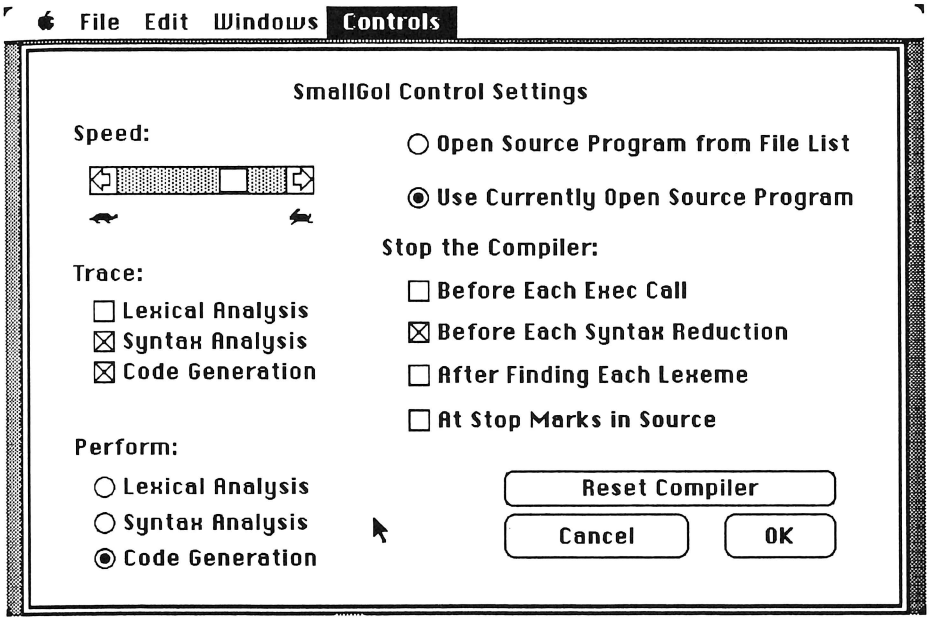


When SmallGol is running it can display several windows. These windows can be individually scrolled, resized, and repositioned to create different displays convenient for watching how separate parts of the compiler work.

Arranging windows to watch how the compiler works.



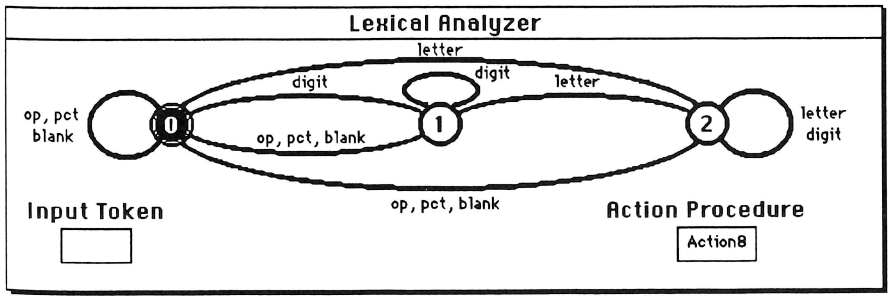
There is a control panel which allows students to set the compiler speed and to isolate various subsystems of the compiler for study. After the subsystems have been understood in isolation, interactions between subsystems can be studied to acquire stepwise an understanding of how the whole compiler works.



Setting the controls.

The controls can be set so that each of the subsystems (such as the lexical analyzer, the parser, or the code generator) can have its actions traced in the "trace window." Also "stop codes" can be placed in the source program and each of the subsystems can be set to stop at key places so that the "before-after" states for its critical actions can be inspected. Once the compiler stops, the "step" button can be used to advance the action a step at a time. This enables the "fine grain" details of each subsystem to be studied at leisure.

SmallGol has a left-to-right, shift-reduce parser and a lexical analyzer whose operation is portrayed by the actions of an animated finite state machine. The current state is highlighted in this finite state machine. When a state transition occurs, an animated bead moves along the arc from the current state to the new successor state. The successor state is then highlighted, and any actions taken are noted in the action procedure box.



Animated Lexical Analysis.

Some details about the Course.

A Few Details of the Course

The course is a one quarter course lasting 10 weeks. In the first three weeks, students learn how to use the Macintosh with the Guided Tours, MacWrite and MacPaint. They also run the SmallGol compiler to learn how it works. Parallel lectures explain the rudiments of compilers.

In weeks three and four, students learn how to use the Lisa Pascal Workshop to compile the SmallGol compiler. SmallGol is written in Lisa Pascal and cross-compiles to run on Macintoshes. Students then learn to extend the SmallGol compiler by adding nested if-statements and arithmetic expressions with full operator precedence.

In weeks five through ten, students start from scratch to implement their own compilers. They are given the syntax of a new small language, *MiniAda*, and a few hints on how to write the syntax analyzer and the code generators.

Reusable software components and progressive examples are key ideas.

The course relies strongly on "software construction from reusable components" and on using "a progression of examples from simple to complex" to develop understanding. To build their MiniAda compilers, students can reuse substantial portions of the SmallGol compiler. In some cases, all that is required is to fill in pre-existing tables with new entries. Reusing the foundation of SmallGol subroutines further eases the burden of writing MiniAda.

In the last weeks of the course, the lectures cover how real compilers work. The structure of some lexical analyzers and syntax analyzers for Ada and Pascal is examined. To understand code generation, the assembly switch in the Lisa Pascal compiler is turned on and Macintosh MC68000 code generated for example Macintosh programs is studied.

The final exam for the course consists of demonstrating a working MiniAda compiler. Student MiniAda compilers must correctly compile ten test programs from a test set to receive the highest grade.

Conclusions

What conclusions can we draw from this experience?

Our experience suggests the hypothesis that animation can be used to advantage to help students understand complex software such as compilers. A compiler construction course may offer students the first opportunity they have ever had to see how a complex piece of software works in detail. Having seen only parts of the beast before, it is the first time they get to see the "whole elephant." But it is important not to throw the full complexity of compilers at them all at once.

Understanding appears to be facilitated by using a progression of examples from simple to complex. Making use of "reusable software components" puts the goal of the course within reach and leverages scarce student lab time. Having students implement their own small compilers appears to help students develop a feeling of self-confidence in their capabilities. Animation appears not only to help students develop understanding, it also appears to accelerate debugging of their own programs.

Of course, the results of just one course are always suspect, and it is hazardous to generalize. Research in educational technology teaches us that a broad base of careful experimentation is needed to develop confidence in any hypothesis that states that some new educational technology improves learning. We acknowledge that more work is needed before we can conclude with confidence that animation is as beneficial as the hypothesis we have stated holds it to be. Nonetheless, the experience we have had suggests that animation can be beneficial, if judiciously and properly applied.

An Interesting Game

There is an interesting game out called MAC-CHALLENGE that should provide you with several hours of entertainment. It is kind of a cross between "Wheel of Fortune" and "Trivia".

You can play alone, with a group of friends, or against a single opponent.

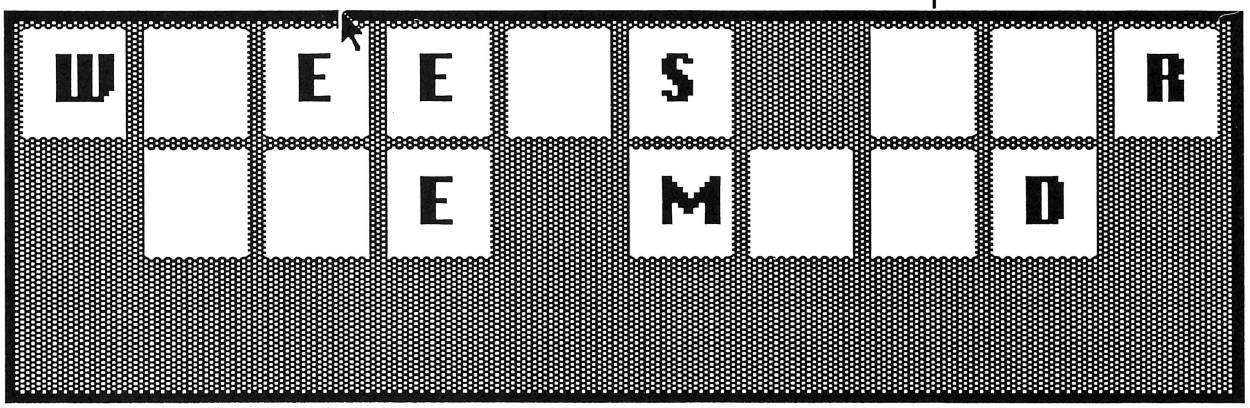
A well known phrase, cliché, famous person, or saying is selected at random and the appropriate blank "boxes" are shown on the screen. The player races against the clock (or an opponent) to guess the hidden phrase.

Hints are given. There is a fair amount of humor sprinkled in along the way. The Macintosh interface is used where appropriate. Best of all, the total cost of the game is only $20 ! Well worth it for the entertainment (and you get a disk to boot) (no pun intended).

Special inexpensive data sets are planned for the future (i.e a sports category, famous people, movies etc.).

If you are interested, send $20 (or write for more information) to :

Microcomputer Applications, Inc.
P.O. Box 670
Winchester, MA 01890



New from Apple

Macintosh Plus Profile

1. What are the key features of the Macintosh Plus?

Macintosh Plus brings you power and high performance.

• Macintosh Plus is a powerful, high-performance Macintosh.

• Macintosh Plus runs the most advanced business software.

• Macintosh Plus combines power, ease of learning, a visual interface, and fast cut-and-paste integration.

• Macintosh Plus provides high-performance peripheral expandability.

• Current Macintosh owners can upgrade to all of the Macintosh Plus features.

2. What distinguishes Macintosh Plus from Macintosh?

Macintosh Plus offers several new features that provide more power and higher overall system performance. Most of the new features improve system speed, storage capacity, or expandability. They include:

There is a lot more memory available.

• An 800K disk drive (twice the capacity of current 400K disk drives).

• A full megabyte (1Mb) of user memory (RAM).

• A keyboard with built-in cursor keys and numeric keypad.

• An SCSI high-speed peripheral port.

• 128K ROM with new file system and RAM caching capability.

3. Why does Macintosh Plus have 1Mb RAM?

1Mb of user memory offers the following benefits:

One million characters of RAM !

• Larger spreadsheets, word-processing documents (about 90 pages of space), and data bases.

• Faster execution of applications requiring large amounts of memory, such as Lotus Jazz and Microsoft Excel.

• Faster launch, running and quitting of applications, using the cache.

• When used with Switcher, it runs more applications and supports cut-and-paste integration across more applications.

4. Is memory on Macintosh Plus expandable?

You can eventually expand to 4 megabytes of main memory.

Macintosh Plus is designed to support up to 4Mb of RAM without a board swap. However, expanding beyond 1Mb requires one-megabit RAM chips, which won't be available immediately. Some third-party RAM-expansion products are available now.

5. What is RAM caching?

RAM caching increases system speed by storing, or caching, parts of software code or data from a disk into RAM memory. Caching into memory allows Macintosh Plus to work faster, because the system doesn't have to access the disk so often. The RAM cache on Macintosh Plus is configurable by the user, through the Control Panel.

6. Why does Macintosh Plus have a double-sided disk drive?

Double sided floppy disks provide 800 thousand characters of storage per disk.

Double-sided disks offer twice the storage capacity of single-sided disks—800K per disk, or 160 pages of text. Obviously, users can store more applications and documents on a single disk. This means that there are fewer disks to swap and manage, more fonts and desk accessories can be installed, and the ImageWriter *and* LaserWriter can be supported simultaneously. The double-sided drive also operates twice as fast as the single-sided drive. The 800K disk drive is built in as part of the system.

7. Is the new disk drive compatible with one-sided (400K) Macintosh disks?

Yes. Users can use current applications and data disks in the new drives without modification.

8. How do single- and double-sided disks work with single- and double-sided drives?

First, a note on terminology: The phrase *single* - or *double-sided disk* refers to media (blank disks) designed for use on one side or two sides. The phrase *one-sided* or *two-sided* refers to how the disk is actually formatted—that is, whether for use on one or two sides.

A double-sided drive will work with *every* kind of disk:

• single-sided (always formatted one-sided)
• double-sided formatted two-sided
• double-sided formatted one-sided

A single-sided drive will work with:

• single-sided disks (always formatted one-sided)
• double-sided disks formatted on one side only

A 400K disk will work:

- in a single-sided drive
- in a double-sided drive

An 800K disk will work:

- formatted on two sides in a double-sided drive
- formatted on one side in a double-sided drive
- formatted on one side in a single-sided drive

9. Is the new disk drive compatible with the Apple II?

Not at present, because Macintosh and Apple II have different architectures. However, Apple is working toward making the Macintosh and Apple II disk drives data-compatible.

10. Will a single-sided (400K) external drive work with Macintosh Plus?

Yes, but only with single-sided (400K) disks or double-sided (800K) disks formatted on one side.

11. What is the new file system? What advantages does it offer? What does it do? Does it work on Macintosh 512K?

The new hierarchical filing system is fast and efficient.

The Macintosh Plus operating system incorporates a hierarchical file system called HFS. HFS allows users to create a hierarchy with their documents and applications. It offers the advantage of flexibility and easier file organization, especially for large numbers of files. Macintosh Plus' 800K disk and optional hard disks can accommodate large numbers of files; the new file system is designed to match the increased storage capacity of Macintosh Plus.

The new file system provides faster system performance because the Finder and other applications can work more efficiently. Finally, there is no arbitrary limit to the number of files the file system can manage; the number is limited only by the storage capacity of the disk. HFS is identical to the file system utilized in the Apple Hard Disk 20.

12. Does the hierarchical file system work with one-sided and two-sided disks?

Yes, although it is primarily intended to work with two-sided disks and hard disks.

When a user selects two-sided formatting, the disk is always formatted with the hierarchical file system.

When a user selects one-sided formatting, the disk is automatically formatted with the Macintosh "flat" file system (MFS). This benefits Macintosh owners who buy the Macintosh Plus Disk Drive Kit and use their single-sided external drive because they can maintain file compatibility with their Macintosh disks. If users want to use their existing Macintosh startup disks (that is, not the Macintosh Plus

startup disk), they should format single-sided disks one-sided, since old startup disks do not work with HFS disks.

On the other hand, some users may want to convert all their disks and files to the hierarchical file system, using updated startup disks. They can, by holding down the Option key while one-sided formatting is selected, format a one-sided disk with the Hierarchical File System. The advantage is consistency in file management and usage within applications (such as Open and Save As commands).

13. Why does Macintosh Plus have a different keyboard?

The keyboard has a built-in numeric keypad.

Many users asked for cursor keys and a numeric keypad to be built into the Macintosh keyboard. This need reflects applications that Macintosh customers use: spreadsheets, word processing, communications, and accounting packages.

14. How does this affect use of the mouse?

Every Macintosh application uses the mouse. The mouse is part of the Macintosh architecture and provides customers with much of the power in the Macintosh interface. However, Apple wants to offer its customers the most flexibility possible and recognizes that many users prefer cursor keys for certain applications. These applications include spreadsheets and communications.

15. What is SCSI, and why is it used on Macintosh Plus?

There is a new high-speed peripheral port.

SCSI stands for Small Computer System Interface, an industry standard high-speed peripheral port. It works especially well for storage devices such as hard disks and tape backups, and can support other peripherals such as scanner and digitizers. The SCSI port on Macintosh Plus is also expandable. Up to seven peripherals can be connected together, or daisy-chained. The Macintosh Plus SCSI port is a high-speed port, transferring data five to six times faster than over the external drive port. This faster transfer rate provides users with better performance for hard disks and other SCSI devices.

16. What SCSI devices are available for Macintosh Plus?

There are several hard disks and tape drives that work with Macintosh Plus. A partial list of compatible products follows this section.

17. Why does Macintosh Plus use mini-DIN 8 connectors on the serial ports?

These connectors are compatible with the newest Apple peripherals, such as the Apple Personal Modem and ImageWriter II. These connectors represent a standard that future Apple products will use.

18. How do users connect their peripherals with DB-9 connectors (such as ImageWriter or Apple Modem 1200) to the new mini-DIN 8 connectors?

An adapter cable from the mini-DIN connectors to the DB-9 connectors is available from Apple.

19. Why are there no slots?

Macintosh Plus provides two basic elements of expandability: RAM memory (to 4Mb), and an expandable, high-speed peripheral port (SCSI) that works especially well with hard disks and other storage devices. These features support the peripherals for which most people use slots, in the case of the Apple IIe. The Macintosh Plus design does not support slots in the way that the Apple IIe's design does.

20. Why is there no color display on the Macintosh Plus?

Macintosh Plus is the most cost-effective system we could create that offers the high performance most users ask for. (With the technology available today, a color solution would not be cost-effective.) And more than 1,000 software applications are designed to take advantage of its high-resolution black and white screen.

21. Does the Macintosh Plus look different than the Macintosh 512K?

The Macintosh Plus looks just like the 512K machine.

The only visible differences are the Macintosh Plus printed on the front of the case immediately to the left of the disk-drive slot, a Macintosh Plus label on the rear housing and a DB-25 connector for the SCSI port on the back. Both serial ports also use the new mini-DIN 8 connectors. Case dimensions are the same, so the Macintosh Plus will not require additional space in labs or on desks. The slot for a Macintosh Security Kit is the same as well, so existing security kits will work with no modification.

22. Why is there no internal hard disk? When will Apple announce one?

The SCSI port provides as much speed for an external drive as can be achieved with an internal hard disk. An external, SCSI-based disk offers the best performance for Macintosh Plus. Customers who want an internal hard drive should consider third-party solutions such as HyperDrive.

23. How does Macintosh Plus work with existing Apple products?

Macintosh Plus supports AppleTalk™, the LaserWriter, and the ImageWriter II. Macintosh Plus also supports third-party AppleTalk products such as file servers, data communications products, and electronic-mail products.

24. What are the other key products introduced along with Macintosh Plus?

The Macintosh External Drive 800K is a new product designed especially for Macintosh Plus. The ImageWriter II, Apple Personal Modem, and Hard Disk 20 also work with Macintosh Plus. In addition, many third-party products work with the SCSI port,

providing customers with several options for hard-disk storage and tape backup.

25. Is all Macintosh software compatible with Macintosh Plus?

The majority of software will run without any modification.

The majority of Macintosh applications shipping today run without modification on Macintosh Plus.

26. What programs aren't compatible?

A complete list of compatible and incompatible Macintosh applications is available at authorized Apple dealers. Some applications require modification by the user to work with the new file system. Many applications have already been revised by their publishers. Other applications will be revised in the near future. This list will be updated periodically as developers introduce and revise applications.

27. How can users get an upgrade for their software?

To upgrade Apple software, the user should contact the university store or operational site on campus. To upgrade third-party products, the user should contact an authorized Apple dealer or contact the publisher directly.

28. Is any software available in double-sided format?

Apple will begin shipping its applications, such as MacDraw and MacProject™, in both one-sided and two-sided format during 1986. We expect other developers to begin offering two-sided versions of their products as the installed base shifts toward double-sided drives.

29. Can a Macintosh owner upgrade to the Macintosh Plus features?

Yes.

30. What is involved in the upgrade?

Current users can easily upgrade to a Macintosh Plus if they wish.

There are three kits available to upgrade existing Macintoshes. The **Macintosh Disk Drive Kit** includes a double-sided internal disk drive, new ROMs, the Macintosh Plus System Tools Disk, and a guide to the new features. This kit requires dealer installation. It provides twice the disk capacity, increases system speed (because the double-sided drive is faster and RAM caching can be used), and includes the hierarchical file system. The Macintosh Plus Disk Drive Kit offers improved performance and increased storage for cost-sensitive Macintosh owners.

The **Macintosh Plus Logic Board Kit** provides a new Macintosh Plus logic board, which includes 1Mb of user memory (RAM), and the high-speed peripheral port (SCSI). A new rear case is included to accommodate the configuration of the Macintosh Plus ports. This kit also contains the *Macintosh Plus Owner's Guide* and System Tools disk. The Disk Drive Kit is required to purchase the Macintosh Plus

Logic Board Kit. The Macintosh Plus Logic Board Kit is recommended for users who want 1Mb or more of system memory and/or want to use high-performance peripherals through the SCSI port.

The **Macintosh Plus Keyboard Kit** provides integrated numeric keypad and cursor keys for Macintosh owners who want these features built into their keyboards. It does not require dealer installation.

31. What about Macintosh 128K systems?

Macintosh 128K owners can purchase any of the Macintosh Plus kits. However, Apple recommends the Macintosh Plus Logic Board Kit for 128K owners who buy the Macintosh Plus Disk Drive Kit. The 800K drive and new ROMs will work with 128K, but some applications will require more memory than is available with the 128K machine and therefore will not run properly.

32. Why aren't the drive and logic board offered together?

Apple wanted to offer users a choice depending on their needs. The Disk Drive Kit offers increased performance and storage at a low price. The Logic Board Kit provides more system memory and expandability. Macintosh owners can buy the Macintosh Plus Disk Drive Kit first, and wait to see if they want to buy the Macintosh Plus Logic Board later.

33. What about third-party memory upgrades for Macintosh?

There are several available. However, Apple does not guarantee that these upgrades will work with any given software application. In addition, installation of certain upgrade products may void the Apple warranty.

34. Is it true that Apple will not upgrade any system that has had a third-party upgrade?

Not necessarily. In general, there is no problem with the Macintosh Plus Disk Drive Kit as long as the dealer can physically access the ROMs.

For the Macintosh Plus Logic Board Kit, the situation is different. Generally there will be a credit applied for the exchange of the Macintosh logic board. If a Macintosh 512K has been altered by a third-party upgrade, the owner will not receive a credit toward purchase of the upgrade.

Third party upgrades do not affect the keyboard kit. Users should also check to see whether their third-party product will work with the Macintosh Plus upgrades.

35. Can HyperDrive be installed in Macintosh Plus without voiding the warranty?

Yes, as long as there's no modification of any Macintosh components.

36. Is the Macintosh 512K Memory Expansion Kit discontinued with the introduction of Macintosh Plus?

The Macintosh 512K Memory Expansion Kit will be available for 60 days after the introduction of Macintosh Plus.

37. Why doesn't the Macintosh Plus cost more than the Macintosh 512K?

Apple was able to design the Macintosh Plus in a more efficient way, and taking this advance in conjunction with the fact that component prices have fallen, has been able to pass on the savings.

Component prices have fallen.

38. What Macintosh Plus upgrades will be available to Lisa® and Macintosh XL owners?

At this point, there are no plans to support the Macintosh XL.

New SCSI-Compatible Products

The following products are being introduced during January. They specifically take advantage of the Macintosh Plus' unique features, including the SCSI port, new ROM, and so on. However, there are many products that have been available for Macintosh that are compatible with Macintosh Plus.

<u>AST-4000</u>

- An SCSI Disk/Tape subsystem for Macintosh Plus
- 70Mb hard-disk storage; 60Mb tape backup

<u>Iomega Corp.</u>

- Bernoulli Box—SCSI removable-cartridge hard disk for Macintosh Plus, two 10Mb removable cartridges—uses Bernoulli technology

- AppleTalk Bernoulli Box—shared storage device for AppleTalk, two 10Mb removable cartridges

<u>Techmar, Inc.</u>

- 20Mb SCSI hard-disk drive for Macintosh Plus

For more information on SCSI-compatible hardware products for Macintosh Plus, contact your operational site on campus or an authorized Apple dealer.

Hard Disk 20

The Apple Hard Disk 20 is a complete, self-contained system providing 20 megabytes of storage capacity (the equivalent of fifty 3.5-inch floppy disks). The Hard Disk 20 comes with all of the cables and software necessary for operation with the Macintosh 512K.

The Hard Disk 20 dramatically increases the storage capacity of a Macintosh system, enabling it to handle thousands of pages of files. Application programs and data files can now be stored in one easily accessible location. And storage and retrieval is two to three times faster than with a floppy-disk drive.

The Hard Disk 20 fits neatly beneath the computer.

The Hard Disk 20 complements the style of Macintosh. It fits neatly beneath the computer, raising it by three inches. Using industry-standard Winchester technology, the Hard Disk 20 consists of two double-sided disks with two dual read/write heads and an actuator mechanism within a sealed, protected housing.

The head-disk assembly, an analog-to-digital board, power supply, and an intelligent controller board are assembled in a single compact plastic housing that matches the Macintosh.

The Hard Disk 20 comes with its own complete operating system, designed specifically for use with the Macintosh. The system includes the Hard Disk 20 driver, Hard Disk 20 Finder, ImageWriter driver, and Hard Disk 20 File System. It also comes with an owner's manual, startup disk, and power cord.

How Does It Work?

The Hard Disk 20 connects to the disk-drive port on the Macintosh, leaving the two serial ports free for other devices. An additional Hard Disk 20 can be daisy-chained to the first, giving the user a total of 40 megabytes of storage capacity and space to connect the Macintosh External Disk Drive. The maximum configuration possible is a Macintosh 512K, two Hard Disk 20s (for a total of 40 megabytes of storage capacity), and a Macintosh External Disk Drive.

The file structure allows use of large numbers (and multiple levels) of files.

The file structure on the Hard Disk 20 is a hierarchical one, also called a "Turbo File System." This means that it has a tree structure that enables the Hard Disk 20 to manage large numbers and multiple levels of files quickly and efficiently, without any need for volume partitioning or other memory-management schemes. This hierarchical file structure differs from the flat directory structure used in Macintosh, which is too slow to manage large disks of files. The Turbo File System allows for the following:

- 20 open files
- 40 open, working directories

• Unlimited directory depth and valence

• 255 characters per full pathname

• 31 characters for CNode name

• 27 characters for volume name

• 122 bytes for largest paramBlock needed (HFGetVolInfo)

• Single volumes up to 4Gb in size (disk allocation block size must be less than 64K)

Specific to the Hard Disk 20, the Turbo File Structure allows:

• 512-byte allocation block size

• 2K file clump size

• 304K preallocated to Catalog B tree

• 304K preallocated to Extents B Tree

Characteristics specific to the Hard Disk 20 Finder:

• 40 nested folders guaranteed

• 12 windows open at once

• Desktop preallocated to 32Kb on the Hard Disk 20

Benefits

The Apple Hard Disk 20 gives users a solution to mass storage for their Macintosh. The benefits are many:

• Increased productivity, because the Hard Disk 20 accesses information two to three times as fast as the 3.5-inch floppy-disk drive and eliminates disk handling.

• Simplified large data-processing tasks by making 20 megabytes of capacity available in one compact unit.

• Increased cost-effectiveness; more than 10 times the storage capacity for the price as with the 3.5-inch disk drive.

• No extra desktop space is needed, because the Hard Disk 20 fits neatly underneath the Macintosh.

• Simplified multipurpose use by allowing the user to access all applications from one disk. This eliminates time-consuming installation of individual applications from 3.5-inch disks.

• Use of the familiar Macintosh user interface, as well as a hierarchical file structure that makes it even easier to learn and use.

• Minimized downtime due to highly reliable Winchester technology. If there *is* downtime, the Macintosh unit can still be used, as opposed to downtime with internal hard disks.

ImageWriter II

The Apple Imagewriter II is a versatile printer, perfect for a wide range of text and graphics applications. It works with any Apple computer to create text and graphics in black or—with appropriate software—six vibrant colors.

The ImageWriter II offers three print modes:

In draft mode, it prints 250 characters per second!

• Draft—for high-speed proofs. It prints at 250 characters per second at 10 characters per inch.

• Standard—for regular correspondence. Printout is at 180 characters per second.

• Near Letter Quality—for text resembling typewriter or daisy-wheel printer output. Printout is at 45 characters per second.

Each mode is instantly available by pressing a button on top of the printer.

Color is an integral part of the ImageWriter II. The optional color ribbon can produce up to seven colors (including black) to give your documents more excitement and emphasis.

Built-in character sets are selectable using dip switches or via software. These include American, Italian, Danish, British, German, Swedish, French, and Spanish.

The ImageWriter II was designed for effortless operation. Simply drop a piece of paper into the printer and press a button to advance it to the proper starting position. A cut-sheet feeder can also be added for automatic processing of standard documents.

Benefits

The Apple ImageWriter II is a versatile printer for Apple computers, capable of handling any application. It offers the following abilities:

• Works with any Apple personal computer system.

• Gives the user a choice of speeds and print qualities, offering output

ranging from draft to near letter quality.

• Lets you print in as many as seven different colors using the optional color ribbon.

• Handles cut-sheet or continuous paper, including labels and multiple copies.

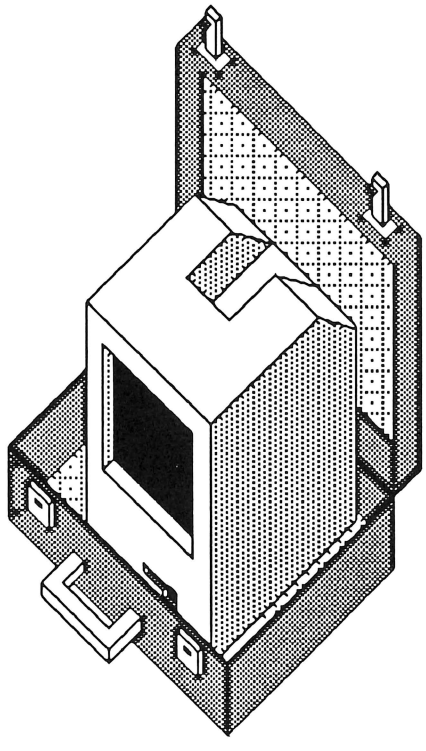
• Features push-button paper loading for single sheets.

• Allows the addition of a cut-sheet feeder for automatic processing of standard documents.

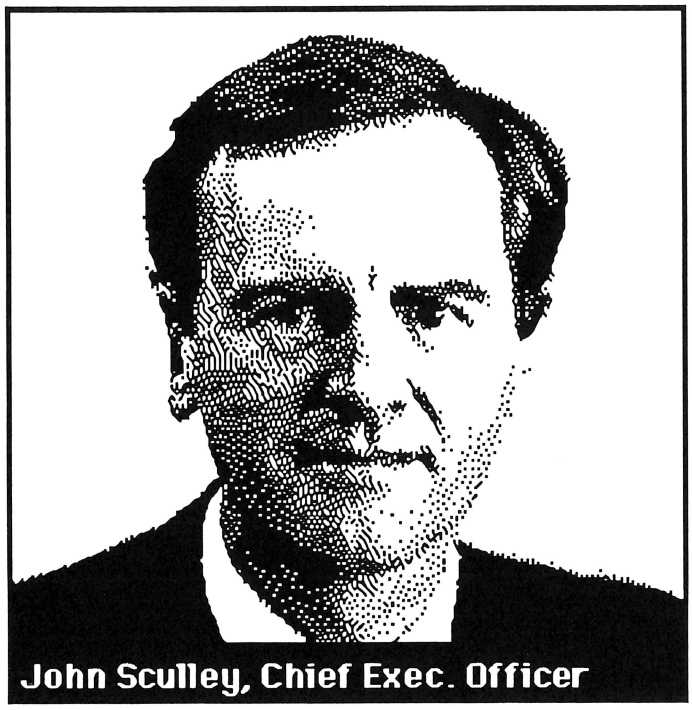
• Is quiet and compact, suitable for use anywhere.

• Supports standard text enhancements such as boldface, superscript, subscript, underlining, and double-width and proportional text with suitable software.

• Offers an optional Memory Expansion Card with an additional 32K of memory for more efficient use of an Apple II.



Apple means business !



New directions with the Chief Executive Officer of Apple Compuuter, Inc.

News and Notes

Novice Developer's Reference Guide

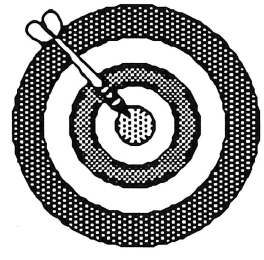
There are lots of people out there among you who will not become experts with *Inside Macintosh*, but who still will write some great applications. These programs may use BASIC, Pascal, C, or one of several other languages.

If you have ever experienced writing a program, you certainly know that having access to listings of already written programs can be an enormous help to you in guiding you toward developing your own.

Where did I see that routine that shows how to keep track of a double click?

The trouble is, most of us don't remember where we last saw the program listing that illustrated in BASIC how to determine whether the mouse button had been clicked twice. And where *was* that routine that illustrated event trapping?... or dialog box construction?

Microcomputer Applications, Inc. has a disk for sale that simply tells you where you can find these listings. It's a great reference, covering several languages and most current and past book and magazine listings. *The actual code is not, of course, included. However, this data base allows you to find a reference to what you want very quickly*



It should be useful to the following people:

Teachers preparing classroom examples and assignments.

Students needing help with projects and programs.

Novice developers looking for references to sample programs and listings.

The disk costs $15 and is available by writing to the following address:

Microcomputer Applications, Inc.
P.O. Box 670
Winchester, MA 01890

Improved Modem

The new Apple Personal Modem further enhances the communications power available to Apple II and Macintosh users. Fully compatible with the Apple communications software used with the current Apple modems, the new modem features auto dial, auto redial, and auto answer. It is fully compatible with the Hayes command set, so it will operate with any software used with Hayes-compatible modems. Communications software is not included with the modem.

Development Languages

Watch for the Macintosh Programmer's Workshop.

Paul Zemlin is the product manager for the forthcoming Macintosh Programmer's Workshop (aka MDS/512, MPS, etc.) and the accompanying Workshop languages. The Macintosh Programmer's Workshop ultimately will consist of at least three separate products:

1. The Macintosh Programmer's Workshop itself, consisting of a new assembler, linker, shell/editor, debugger, resource editor, and various utilities.

2. Macintosh Workshop Pascal, an add-on product to the Workshop itself, with roots in Lisa Pascal.

3. Macintosh Workshop C, another add-on product to the Workshop.

TIPS FOR DEVELOPERS ON STAYING COMPATIBLE WITH FUTURE MACINTOSH COMPUTERS

Software developers should plan ahead.

Don't assume a fixed memory size.
In other words, don't assume that the computer is either 128K or 512K. There are lots of reasons for this. The Macintosh XL enviroment can have a megabyte of RAM (or more, with third-party upgrades), and many companies offer Macintosh memory upgrades that go beyond 512K. In addition, Switcher program users can configure memory partitions in odd sizes, such as 256K.

Don't assume a maximum of two drives, each with 400K.
If you do this, you should already be having problems working with hard disks, and you'll have more trouble in the future. The Macintosh File System provides calls to determine how a large disk is and how much free space remains on it.

Use documented global variables for system values.
For example, don't hardcore the screen size to 512 by 342. If you do so, you should be already having trouble working on Macintosh XL. Instead, use the global variable called screenBits.bounds to determine the size of the screen.

Be sure your application works with Macintosh XL.
If it doesn't, it's likely that your application has some underlying problems that will prevent it from working with future Macintoshes. If it doesn't work with Macintosh XL, find out why.

Nibble Mac Debuts

Nibble Mac, a bimonthy Macintosh magazine from MicroSPARC Inc., publisher of *Nibble* magazine, premiered in September. Each issue of *Nibble Mac* will include original ready-to-type-and-run programs, along with supporting articles for business, home and personal finance, games, utilities, and graphics. In addition, it will present tips and techniques, reviews, new product announcements, and innovative new ideas.

This magazine contains program listings that can be entered directly into your Macintosh.

Nibble Mac will initially be distributed through the company's existing dealer/distributor channels, which cover Waldenbooks and B. Dalton bookstores and more than 300 computer retail outlets. It will have a cover price of $2.50 and a $16.95 subscription rate for eight issues.

Apple-Label Macintosh Software Release Versions

Application	Current Version
Finder	5.0
Macintosh 6800 Development System	1.0
MacDraw	1.7
MacPaint	1.5
Macintosh Pascal	1.0
MacProject	1.0
MacTerminal™	1.0
MacWrite	4.5

Do you have the latest version?

MacDraw Information

Apple is working on a new version of MacDraw. It seems that the current version (1.7) has a bug. To avoid losing changes made since your last Save or sneaky system errors, *simply click only on the Yes/No buttons in dialog boxes*. Clicking on background, text, and so forth, can lose your most recent changes and/or cause a system error!

Look for a new version of MacDraw.

New Version of MacWorks XL Available

The upgraded MacWorks™ XL, Version 3.0, is now available from your Apple Support Center. You will notice that the external packaging, order number, and price have not changed, and only two of the MacWorks disks have been upgraded. Upgraded disks can be identified by the code, 682-0087D, on the label on the back. Once loaded onto the hard disk, the new software can be identified as Version 3.0 during startup.

You can start the Macintosh XL directly from the hard disk.

With the MacWorks XL, users can start a Macintosh XL directly from a hard disk, if the hard disk is used solely for Macintosh software. The software supports the LaserWriter and AppleTalk Personal Network, and also supports quick access to more files through an enhanced Finder.

MacWorks XL Upgrade Program

MacWorks users can upgrade to the new version by sending a check for $29, their original backup disk from the old version of MacWorks, and the enclosed order form to:

Apple Computer Processing center
MacWorks XL Upgrade Program
P.O. Box 6272
San Jose, CA 95150

Modification Kit Improves Macintosh XL Graphics

Improve the graphics on your Macintosh XL.

Now Macintosh XL users can get the "square dot" resolution of a regular Macintosh, with the newly available Macintosh XL Screen Modification Kit. This modification kit enhances the Macintosh XL by changing the video security to take advantage of software made for the Macintosh 128K or 512K.

Designed for the Macintosh XL computers, the modification kit will run Macintosh software only. This means that Lisa 7/7, the Pascal Workshop, and other operating systems will not work on a modified screen.

The modification kit includes three ROMs, a special transformer, and two copies of MacWorks XL, Version 3.0, a program designed to take advantage of the improved screen resolution. The kit must be installed by an authorized Apple service technician, (a 15- to 30-minute procedure).

Upgrading the Microsoft BASIC Interpreter

The new version is faster. How much faster? The standard Sieve of Eratosheres Benchmark implemented from BYTE Magazine shows the following increase:

MICROSOFT BASIC 2.0	113 seconds
MICROSOFT BASIC 2.1	68 seconds

Quite a difference. And you'll find the program performs even better than before. It's another part of the Microsoft commitment to provide you with the most up-to-date computer products.

Two other products that will interest you as an Macintosh owner are Microsoft FORTRAN and Microsoft BASIC Runtime Interpreter. To find out more about these products and how they can help you, call (800) 426-9400 for further information; in Washington State and Alaska, call (206) 828-8088.

Microsoft Basic Interpreter—License to Sell

If you're serious about using the Microsoft BASIC interpreter for the Macintosh as an applications tool, consider obtaining the rights to the Microsoft BASIC Runtime Interpreter for the Macintosh. This license allows you to distribute the Microsoft BASIC Runtime Interpreter with your programs. So your program can stand alone, without the user needing to purchase Microsoft BASIC. Call (800) 426-9400 for further information; in Alaska or Washington State, call (206) 828-8088.

Now you can bring your BASIC programs to the marketplace.

Basic Compilers for the Macintosh and Lisa

By Ed Rosenweig
Pterodactyl Software

Pterodactyl Software has three compilers for the Macintosh and Lisa. The first compiler runs under the Pascal 3.0 Workshop on the Lisa, and generates assembler and an exec file. After a successful compile, you simply run the exec file—the assemble and link steps are automatic.

There are three compilers available for the Macintosh and Lisa.

The compiler's main features are MOUSE, on Mouse GOSUB, dynamic program arrays, 384K data size, unlimited program size, and an eject statement. Pascal, QuickDraw, and assembler routines can be called from this BASIC. As is true of all three Pterodactyl compilers, the Lisa Workshop compiler (PCBASIC) is compatible with BASCOM (BASICA) code as used on the IBM PC. This compiler costs $250, and a runtime license is available for $750.
The second compiler is a cross-compiler. Compilation is under the

Pascal 3.0 Workshop with the Version 3.9 Macintosh Software Supplement—the compiled object code runs on the Macintosh (or MacWorks). As with the first compiler, an exec file and 68000 assembler are generated. However, this compiler's exec file uses four steps—assemble, link, resource compile, and Maccom—to transfer the final product to the Macintosh-formatted disk.

Resource files are used to create dialog boxes, alert boxes, and menus.

This compiler uses resource files to their fullest to create dialog boxes, menu boxes, alert boxes, input to data statements, compiler directives, and even error messages. Multiple windows, each with automatic redrawing, are supported. Function keys on the IBM become menu items on the Macintosh (with no change in the code). You can create your own debugging subroutine with ON TRON GOSUB, which is called at each line number.

Finally, there's a version of PCMABASIC for the Macintosh. This compiler requires the Macintosh 68000 Development System from Apple. It runs completely on the Macintosh, and generates a Macintosh application. In all other ways, it is identical to the cross-compiled version—all the same powerful features are supported. This version costs $250 and includes a limited runtime license—provided our name is mentioned in the documentation. An unlimited license and in-depth technical support (for large developers and corporations) are available for $750.

For further information, contact Ed Rosenweig at Pterodactyl Software, P.O. Box 308, 24 Ivy Lane, Woodacre, CA 94973; (415) 488-9865. A full spec sheet on all three compilers is available free.

Microsoft FORTRAN

Engineering professionals will be especially happy with FORTRAN.

Microsoft FORTRAN for the Apple Macintosh is a full implementation of ANSI FORTRAN 77 (the current standard for implementations of the FORTRAN language). It's the same one widely used on mainframes and minicomputers. Anything written on standard ANSI FORTRAN 77 can be ported to and from the Macintosh with little or no source-code modification. And this version from Microsoft comes with all the productive tools you need: debugger, linker, librarian, editor, and resource compiler—even Macintosh-oriented sample programs. Microsoft FORTRAN also provides access to nearly 500 Macintosh toolbox routines.

Microsoft FORTRAN is a great tool for learning the language, because the powerful source-language debugger can be used clearly to demonstrate the effect of each language element. So universities and other educational institutions can easily teach standard ANSI FORTRAN 77.

Engineering professionals will like Microsoft FORTRAN, too, because they'll appreciate its FORTRAN language support. The powerful Macintosh graphics ability in a low-cost, dedicated desktop processor makes it an interesting choice for computer-assisted engineering (CAE) and design (CAD/CAM). Call (800) 426-9400 for further information; in Alaska or Washington State, call (206) 828-8088.

Microsoft Word for the Macintosh, Version 1.05

New Features and Modifications

- Increased output speed (up to 400 percent)
- Improved word and character spacing
- Manual feed now operational
- Cancel print now operational

Microsoft Word has been improved.

New Word Convert utility

- Converts Macintosh Word documents to MS-DOS word documents and back
- Retains full formatting

VideoWorks Object Code for Developers

By Marc Canter

VideoWorks is a full-fledged animation program that features 24 sprites on the screen at once.

Because of the wide range of applications that people are interested in implementing, we have developed a multitiered approach to sublicensing. The amount of royalties will be based on the different levels of code usage. If you'd like to include animation in your "About the..." window, or just plain jazz up your program, then we'll barely charge you anything for the code (just initial costs, a small license fee, and tech support). If you'd like to produce a complete video game—or educational game—that uses animation throughout, then we'll charge more for licensing (going up to a maximum of 60 cents a unit).

Videoworks routines can now be incorporated into your own programs.

VideoWorks

The interface will consist of a jump table that is accessed at the start of the object code. Standardized functions (in each of various languages) will be included with the package to pass parameters and call the available routines. Functions include:

- Starting and stopping VideoWorks documents.

- Isolating and repeating animation channels.

- Maintaining the background processes involved in animation.

- Writing images onto the screen in various modes, (XOr, Or, Copy, NotOr) and executing QuickDraw primitives.

- Playing back sound effects and one-line melodies. (We will also be supporting the various sampling boxes that are becoming available.)

• Changing frame rates (tempo) and background screen (black or white).

Sample programs usable by Lisa Pascal, MDS Assembler, C, and so forth, will be available, as will the actual VideoWorks relocatable object code.
MacroMind is also announcing a "Guided Tour Authoring System" we've developed for users who are not full-fledged programmers. This system provides a quick and easy way to create sophisticated guided tours. It allows you to define sprites as "buttons," so that when the user presses them, the animation will pause, continue, or branch to another document. The resulting collection of VideoWorks documents and "Tour Engine" can be combined into a single, double-clickable application. Licensing arrangements are similiar to those for VideoWorks object code. For more information, contact Erik Neumann at MacroMind; (312) 327-5821.

A new tool is available to help you create your own customized guided tours.

SLIDE

Slide Show Magician

New, Changed, or Added Features

• Slide Show Magician runs on any Macintosh 128K or 512K. It will now also run on the XL, or Lisa, with MacWorks. You can even use a RAM disk or hard disk.

• If you decide to DEMO a show while you're creating it, the demo will now start from the current frame. (It will not have to start at Frame #1 each time.)

Slide Show Magician now allows you to have up to 10 multiple choice selections on any screen.

• The Copy Frame and Paste Frame functions are more versatile. Before, you could use them only on the EDIT Master Screen. Now you can use them on *any* of the Master Screens.

• A new Change Frame function lets you change the frame you're working on from any screen. You no longer have to return to the EDIT Master Screen.

• New "go to" buttons let you jump from any frame to any frame...so you can have up to 10 multiple choice selections on the screen at any stage of your slide show. This is perfect for training, tests, quizzes...whenever you want *user interaction.*

• There's a full range of type fonts and sizes. And you can use Font Mover to add other fonts.

• The movie-type special effects now include PICTURE-OVERLAY capability, which saves time and memory, and lets you create more intriguing graphics.

• There are three sound possibilities, optional at extra cost. However, they will work only with the Macintosh 128K or 512K.

(Lisa and the Macintosh XL do not have sound capability.)

—Macintalk from Apple Computer. If you have access to a copy of the Macintalk program, you can start adding its computer voice right away.

—Tape Recorder Sync Cable. This cable will allow your Macintosh to control a tape recorder, or let a tape recorder control your Macintosh.

Now you can add your own digitized sound to your applications.

—Natural or digitized sound cable. It makes possible quality natural sound, with nothing mechanical sounding about it. It allows you to use any voice you choose: yours, the boss's, an actor's, your kid's—male or female. You may also use music or sound effects in any combination you wish. You create your recording on a tape machine and the sounds are then transferred by the cable onto your slideshow frames. Digitized sound is high-quality sound. Unfortunately, this means it takes up a lot of disk space. While various Macintosh configurations can be used, a 512K with a hard disk is highly recommended.

• Special Sound Program Disk. This disk, optional at extra cost, contains all the programming needed (plus "Magnum Hints") for you to easily create and edit Apple's Macintalk computer voice. The disk also includes *additional* Master Screens for the digitized method so you can do "professional" studio type editing and create special "sound tricks" for your show. For example, stretch out words; repeat sounds or change their tone and volume; cut, copy, and paste sounds from one area to another; and more.

Hero Award

Award Winner.

A student at The College of Wooster (Ohio) and a 1985 graduate of the college have received the first-ever Apple Computer Student Hero Award for their work in designing and installing the first self-contained personal computer network in the country to link every room in a liberal arts college residence hall.

The students, junior Winnie Williams and graduate Bruce Jones, used the AppleTalk Personal Network for the project, which officially began operating September 11 in the 68-room Douglass Hall.

The residence hall network, called the Douglass Experimental Network (DEN), allows communication among all users on the network and offers access to a LaserWriter printer, a graphics library, and a public-domain software library.

Once DEN is bridged to Wooster's state-of-the-art broadband campus network, WoosterNet, any student who lives in Douglass and owns a Macintosh or IBM-compatible personal computer will be interactively connected to Wooster's VAX 11/750 minicomputer, its terminals, and other microcomputers in every academic and residential building on campus. A student using a microcomputer in his or her room will be

able to obtain data from VAX and to incorporate it into a paper in progress.

The student would then be able to add illustrations pulled from the Douglass graphics library and send portions of the paper to a faculty adviser's terminal for comment and correction.

"The network was relatively simple and inexpensive to put together," said Williams. "All the equipment was 'off the shelf,' and we installed the system without engineering expertise."

Apple Courseware Exchange

The Apple Courseware Exchange is a program to aid colleges and universities in developing and integrating academic software into the curriculum. Its three main objectives are the following:

One of the objectives of Apple's educational program is to make software easily available to all schools.

1. To provide a low-cost distribution mechanism for academic software.

2. To encourage academic software development in many disciplines.

3. To foster adoption of computing tools in higher education.

The program is being implemented in conjunction with Kinko's Copies, Inc. Kinko's has more than 250 branches and is located near most college and university campuses in the country, so it provides easy access for students and faculty. Kinko's will publish an academic software catalog, process software submittals, duplicate disks, assemble packages, reproduce the documentation, process orders, and distribute the software. Long-term plans call for an electronic delivery system, utilizing a data base of academic software, uploading and downloading free software, a bulletin board, and electronic mail.

Courseware is defined as follows:

- Primarily quasi- or noncommercial.
- Sells at low prices to encourage adoption for courses.
- Returns respectable royalties to developers to underwrite development costs.
- Is specific to particular disciplines, and may lack broad commercial appeal.
- Sells at lower volumes than commercial software.

University developers and faculty members may submit courseware to the Courseware Exchange Program by following the submission guidelines and completing a submission checklist. A description of the contents of these follows.

Submission Guidelines

Included will be the following:

- A description of the Apple Courseware Exchange, its goals and purposes and a description of Apple's and Kinko's roles.

- Definition of who may participate.

- A description of the services offered. These include packaging for disks and documentation, distribution, an 800 number for orders, order processing and tracking, royalty payments, software replacement and warranty, provision of a channel for support questions, catalog maintenance and distribution, and development of marketing programs (advertising, brochures, catalogs, and conferences).

- Guidelines for software development. Classifications of software (public domain, templates, applications, tools), suggested courseware areas and examples, available languages and development systems, available technical resources, testing guidelines and procedures, and documentation formatting and editing suggestions would fall under this heading.

- Suggested pricing structure.

- An outline of the support policy.

- A copy-protection policy.

- An Apple Courseware Exchange License Agreement. This is a generic agreement to be used for all software submisions.

- An explanation of how to complete the submission checklist and the fee structure.

- A list of further information resources.

Submission Checklist

A Submission Checklist will be included and will serve several purposes. It will...

- Provide a contract with the developer, containing terms and conditions of the agreement.

- Protect Apple Computer and Kinko's Copies from liability.

- Provide the information needed for a catalog listing and description of the software. The software will be described in terms of its classification (public domain, template, application, tool), discipline, target audience, description, suggested use, and examples of use.

- Provide appropriate information for disk labels.

- Provide information on the developer (name, address, institution and phone).
- Designate recipient of royalty payments.
- Give hardware and software configuration requirements.
- Verify checking and/or testing of software and documentation.
- Set developer's pricing.
- Designate an appropriate support contact person.

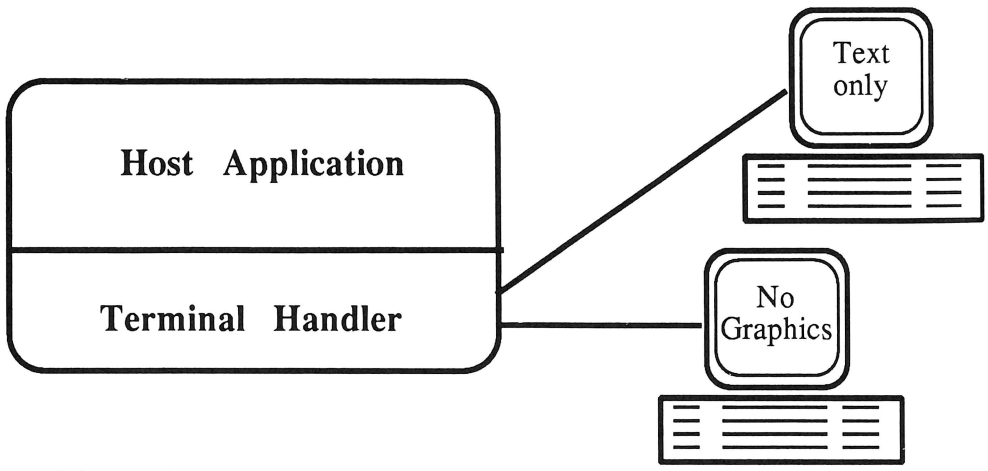
The developer will submit software and the submission checklist to Kinko's for the Courseware Exchange Program. The software will be included in the catalog and available for ordering by anyone in the country through Kinko's. A faculty member can go to Kinko's, purchase a copy for evaluation and then decide to use the program in a course. Software will generally be less than $30 per copy (affordable for students).

Look for the first catalog to be available in March of this year.

The first courseware and courseware catalog will be available in March.

MacWorkStation

MacWorkstation is a new development tool.



By Eric Zarakov, Apple University Marketing

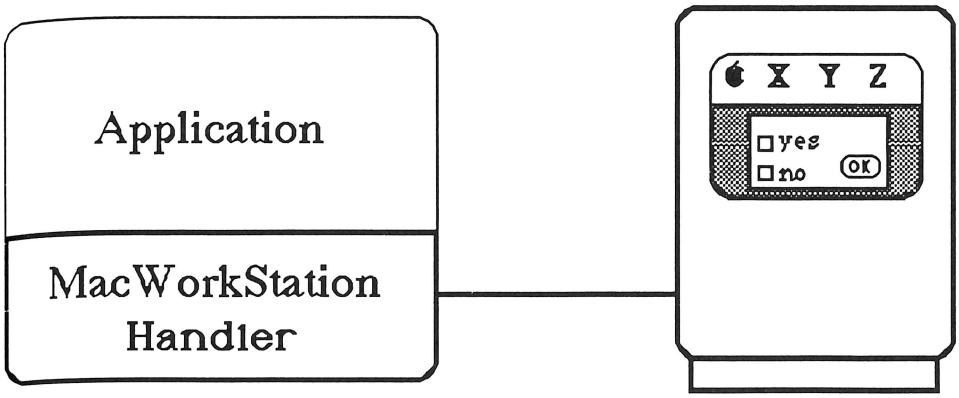
Apple has just released a new development tool called MacWorkStation. The software was developed by an Apple MIS group development group as a tool for internal use, but it proved so useful that Apple has decided to release the software for use by third-party developers.

What Is MacWorkStation?

A host-based Applications Environment that enables host-computer software to control the Macintosh user interface on Macintosh

workstations.

The idea behind the MacWorkStation is that it's time for a way of writing applications on a host that can utilize the really great



workstation interface of a Macintosh. (Typically, applications have been confined to whatever terminal type is available on the host, DEC VT100, IBM 3278 or 5251, and so on. These terminals are text-only with only limited graphics, if any at all.)

Typical Host Terminal Interface

The usual approach to using a Macintosh with these types of applications is to build a program that emulates the type of terminal being used by the host. While this has the obvious advantage of allowing the user to run stand-alone programs, it still requires that he or she mentally switch back and forth between the Macintosh interface and the host terminal interface.

MacWorkStation changes all that. Now an application user can have the best of both worlds: the power of the host computer and the user interface of a Macintosh. An application can now be built that uses the Macintosh concepts and characteristics, such as windows, dialog boxes, menu bars, graphics, icons, and so on. Indeed, the application can also off-load printing, filing, and text editing to the MacWorkStation.

Now you can have the best of both worlds : the power of the host computer and the user interface of a Macintosh.

MacWorkStation Interface

How Does It Work?

MacWorkStation is really two things: a protocol definition and a first implementation of that protocol. The protocol defines commands that are sent to the Macintosh, telling it what to do (for example, put up a dialog box). Events are defined to pass back to the host what's happening on the Macintosh. Much of what the Macintosh does, however, is never needed by the host, and is therefore not passed back. For example, if the host application tells the Macintosh to put up a menu bar and items in each menu, the Macintosh need not tell the host anything until a menu option is selected.

Why Use MacWorkStation?

First of all, MacWorkStation allows the end user to see and use the friendly Macintosh user interface when using host-based applications. It's a common complaint that traditional terminal interfaces to host applications generate significant training and ongoing support costs. In a recent survey of Fortune 500 data processing managers and vice presidents, the Macintosh was praised for its ability to reduce user training costs enormously. Each new application uses a set of interface characteristics with which users are already familiar, freeing DP departments from the burden of telephone calls from confused or frightened users.

Host-based applications allow Macintosh users to share common data.

There are many other advantages to using the MacWorkStation approach. Host-based applications are multiuser and allow Macintosh users to share common data. Application enhancements are done on the host, requiring no redistribution of Macintosh software. The program can also be used as a prototyping tool for Macintosh developers, since it is relatively simple to write MacWorkStation host programs to model Macintosh user interfaces.

But again, the major advantage is that MacWorkStation eliminates the need for terminal emulation. It's the beginning of a truly human interface to the information processing provided by the host computer.

Who Should Use It?

Anyone who is implementing an application on a host, or who wishes to enhance an existing application to use the Macintosh user interface. Obviously, this is a broad range of people.

Businesses using computer systems can certainly benefit from the advantages offered by MacWorkStation. Universities have large installed bases of Macintosh computers and could utilize MacWorkStation. Host applications developers wishing to leverage the advantages of the Macintosh in their products could use MacWorkStation. Software houses that are on the leading edge of providing a truly great workstation interface to their systems are also candidates for using MacWorkStation.

When Can I Get It?

The MacWorkstation Toolbox is now available.

The MacWorkStation Toolbox is now available for licensing from Apple Computer, Inc. as an *unsupported* product. The toolbox includes:

- The MacWorkstation software (source code and object code for the Macintosh).

- The MacHost software (source code and object code for UNIX V and VMS operating systems; a port to UNIX 4.2 takes less than an hour.)

- Extensive documentation describing the software and protocols.

- Test bench software for the Macintosh to verify installation.

The host software is available for UNIX system V and VMS on a STAR format, unstacked 1600 bpi magnetic tape. The software is easily portable to other operating systems. The one-time license fee for MacWorkstation is $1,500. For more information call (408) 973-4667 or write:

Apple Computer Inc.
Software Licensing Dept.
M/S 23F
20525 Mariani Ave.
Cupertino, CA 95014

Expert Systems Building Tool

The well-established expert systems building tool, OPS5, is now available on a personal computer. ExperOPS5 combines the processing power of the Macintosh with the rich LISP features of ExperLisp to create an environment for expert systems development that rivals those previously found only on expensive LISP machines.

Many people believe that Expert Systems will provide the next "revolution" for computer users.

ExperOPS5 is testimony to the power and versatility of ExperLisp. Science Applications International Corporation of La Jolla, California, successfully converted more than 5,000 lines of OPS5 LISP source code into ExperLisp. The resulting implementation of ExperOPS5 retains the function and speed of its Xerox 1108 counterpart while running on a Macintosh.

ExperOPS5 features a forward-chaining inference engine coupled with a powerful pattern-matching algorithm. A special added feature is an interface that provides users with complete access to ExperLisp.

ExperOPS5 requires ExperLisp, a Macintosh 512K and an add-on floppy, or hard disk drive. It's available through selected computer retail outlets, as well as directly from ExperTelligence.

Contact:
Dick Messier
ExperTelligence
559 San Ysidro Road
Santa Barbara, CA 93108
(805) 969-7874

News from the Networks

Compiled by : Jerry Keough
Department of Mathematics
Boston College
Chestnut Hill, MA 02167
BITNET : KEOUGH@BCVAX3

From: chavez@ucbcory.Berkeley.EDU (Thomas M. chavez)
Subject: Strange System Fonts in Finder

Watch out for the missing Geneva font.

Some utilities (like RamDisk) sometimes play with things that they aren't supposed to. The most common sign of this is the loss of the Geneva font in the Finder. Having recently had this problem, here is my solution.

The problem is *not* with your disks. There is no way that the software could affect each and every disk that you put in (unless it broke the drive) so the problem must be in the Macintosh. The Macintosh maintains some low-memory with the battery (yes, it also keeps the clock going). Information about things such as AppleTalk, Control Panel settings, clock, and so forth, are kept here so that you don't lose them when the power is turned off.

Well, like I said, sometimes things go wrong. The solution—take out your battery for about a minute or two. This will kill the low memory. You will lose the time and your Control Panel settings, but you will probably also lose whatever bug caused the font substitution.

Hope this helps...
Tom Chavez
chavez@berkeley

From: "Steven B. Munson" <sbm@Purdue.EDU>
Subject: "System font" question answered

That battery does more than give a charge !

We have already seen that removing the battery for a while solves the problem with the "system font" (actually the default application font), but Jay asked what the parameter RAM (nonvolatile RAM run by the battery) had to do with fonts. The parameter RAM contains, in addition to the stuff you set in the Control Panel, the Modem and Printer port configurations, the alarm setting, the printer connection (whether the printer is connected to the Printer or Modem port), and the default application font number minus 1. The default application

font is, of course, the font used in applications if they don't ask for a different one, and the Finder, after all, is just another application. The default value is 2, which is Geneva's font number minus 1. New York's font number is 2, and Chicago's number is 0, so I guess your parameter RAM had a -1 in this field. It's all explained in *Inside Macintosh*, starting on page 3 of the Operating System Utilities Programmer's Guide section.

Steve Munson
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From: Dan Winkler <daw%brown.csnet@CSNET-RELAY.ARPA>
Subject: Alan Kay - "When Will Computers Disappear"

Alan Kay gave a talk here today entitled "When Will Computers Disappear?" By that he did not mean when will we stop using them, but rather when will they become so commonplace that they lose their high visibility and blend in like telephones. Here are some of the interesting things I remember from his talk. This is done from memory, but is correct to the best of my knowledge.

He said that mice had been used at Xerox "over our dead bodies." They wanted to use a graphics tablet as their pointing device, but it was much too expensive. He said that the reason gray levels had not been used on the Xerox machines was that they wanted to see how it would eventually look on a liquid crystal display in a (dyna) book-sized computer. In a machine with a CRT, such as the Macintosh, he saw no justification for not using gray levels.

The LaserWriter gets high praise.

He said that Apple should never have sold a 128K Macintosh, comparing it to a flashy car with a tiny gas tank. He had high praise for the LaserWriter, though. He had made some nice slides with it, including one large octagonal sign that read "Warning! IBM Jokes Ahead." He did have some wonderful IBM jokes, but it would be inappropriate to repeat them here. (There was an IBM executive present who took them in very good humor.) When asked what was going on at Apple these days, Kay said he didn't know, but that he was having a good time.

Don't ask users what they want !

Kay criticized the approach of asking users what they want, saying that they usually think they basically want more of what they've got, except cheaper and better. Thus, people can get to like even lousy ideas, such as function keys, if they spend a long time learning to use them.

Kay thinks that one of the best books on systems programming is *The Federalist Papers,* because it describes the control program for an enormously complicated system that has run for 200 years without breaking down. Other books he recommends are *The Inner Game of Tennis* by Tim Gallwey, which discusses how to use the subconscious mind more effectively; *Psychology of Invention in the Mathematical Field* by Hadamard,which surveys the techniques of the

top 100 mathematicians at the time (including Einstein, who said he had a physical, muscular, tactile approach to abstract problems that let him "feel" the spaces he was working with); and *Molecular Biology of the Cell* by Alberts et. al., which Kay says assumes no prior knowledge and can be read like a novel but describes every known mechanism of the cell. I guess that came up because he gave an estimate of the number of bits of information in an ecoli cell. I don't remember what it was exactly, but it was large, on the order of hundreds of megabytes, and he noted that the ecoli cell itself was much smaller than a mammalian cell. Kay also recommended his September 1977 article in *Scientific American*, which has now been reprinted in a book called "Microelectronics" published by Freeman.

There are three styles of thought : "Doing", "Images", and "Symbols".

On the topic of subconscious versus conscious thought, Kay identified three styles of thought, which he labeled "Doing," "Images," and "Symbols." As an example, he described how children of various ages write Logo programs to draw circles. A 5-year-old, when asked to close his eyes and walk in a circle, observes that he walks a little and turns a little, over and over. This translates into a very nice Logo program to draw a circle. A 10-year-old might know a little more about the definition of a circle and might observe that all points are the same distance from the center. He would write a program that repeatedly moved a certain distance from the center, drew a dot, returned to the center, turned, moved the same distance, and so on. This works too, but not as well. A 15-year-old would be lost, however, because he knows too much; he knows that r^2 = x^2 + y^2 and would get completely lost trying to program it.

Window technology will soon be obsolete.

Kay feels that window technology will soon be obsolete, because the amount of information that people can comprehend by direct browsing is much smaller than the amount available through networking. He described the need for semi-intelligent agents (processes) and mentioned a system he built in which agents would scan various electronic news services at night and build a custom newspaper for you based on the system's knowledge of what you would be interested in. Thus the headline might be that U.S. planes are bombing in El Salvador (they are), or it could just as well be that your afternoon appointment was canceled (which the agent learned by reading your electronic mail)—whichever would be of more interest to you. The system even had a videodisc of faces of famous people and maps of famous places that it would use to illustrate your newspaper.

Kay described a system built at Atari in which people would wear a device like a watch (it did indeed tell time) that would allow a computer to track them as they moved through the building using a cellular-telephonelike system. When they entered a room, it would already have their speech recognizer all loaded and ready and since it could also tell where in 3-space the watch was, you could point at something and say "turn on that light."

Well, that's all I remember at the moment. Maybe someone else who was also there could supplement, correct, and clarify this summary.

Dan.

From: "Carl D. Howe" <cdh@BBN-LABS-B.ARPA>
Subject: be careful where you put your disks

Don't put floppy disks on top of your ImageWriter.

Someone here at BBN pointed out something potentially dangerous regarding ImageWriters. Unbeknownst to the uninitiated, the cover of an ImageWriter (the buff-colored ones that match the Macintosh) contains a permanent magnet over on the left side. The purpose of this permanent magnet is to keep the plastic cover seated and secure.

A side effect of this permanent magnet is to render floppy disks that you place on top of your ImageWriter unreadable. Moral: Never put your floppy disks on top of your ImageWriter, even temporarily.

From: Dan Winkler <daw%brown.csnet@CSNET-RELAY.ARPA>
Subject: Terminal Program Suggestion

I like the way MacTerminal and Versaterm will translate mouse clicks into vi motion commands. I would like to see a terminal program that will translate clicks in the scroll bar into vi scrolling commands.

From: jean-luc Brouillet <BROUILLET@SUMEX-AIM.ARPA>
Subject: Andy Hertzfeld conference on MAUG

The following is a transcript of an on-line conference with Andy Hertzfeld. I found this on MacSaugus (617-231-2810, two lines, 1200 baud). [*Note: I've done some cutting to keep things down. The complete file resides in <info-mac>news-ahconf.txt -jek*]

(Chris (DOTP)) Andy, before Switcher 2.5, I talked to you about using the right menu bar that you use for arrows. You said the arrows could be turned off. I can't find the command in the Switcher doc to turn off the arrows.

(Andy Hertzfeld) There is a way to turn off the arrows under program control. I'm writing a document called "Inside Switcher" that reveals that and many other little tricks. It should be finished and uploaded here in a week or so.

Who chose the mouse?

(Bill Nicotera) WHO'S IDEA WAS IT TO INCORPORATE THE MOUSE WITH THE MACINTOSH?

(Andy Hertzfeld) I guess it was Steve Jobs' idea. Jeff Raskin hates mice; when Steve took over he changed the direction of the project to "the people's Lisa." Bill Atkinson was a big supporter of the mouse for Lisa.

(Steve Ura) Andy, will the Finder in ROM hurt those with non-Apple 512K and/or HyperDrives?

The Finder will not be in the 128K ROM.

(Andy Hertzfeld) The Finder will not be in ROM in the 128K ROMs. Most everybody will be able to easily upgrade to the 128K ROMs since all Macintoshes have socketed ROMs.

(Eric Wainwright) Which parts of the ROM did you actually write, and which part was the hardest?

(Andy Hertzfeld) I wrote about 30 percent of the ROM including most of the toolbox (everything except TextEdit, Resources and Dialogs). Different parts are hard for different reasons. The most intense part was IOCore, because you have to worry about interrupt-type problems. Much of the toolbox was difficult because I had to rewrite it many times because our goals kept changing. So far, I have written five different font managers!

(Bill Gibson) Andy, I have two questions: 1) How far off are 128K ROMs and did you help write them? 2) Are there any plans to support the LaserWriter at 300 dpi?

(Andy Hertzfeld) The only thing I did for the new ROMs was a new font manager. The new font manager supports fractional character widths that will be a big help at improving the LaserWriter at 300 dpi.

What is the best development system for the Macintosh?

(John Gallaugher) ANDY, in your opinion, what is the best development system for the Macintosh and WHY?

(Andy Hertzfeld) A lot depends on what languages you like and your personal working style. I write all my programs in assembly and use the MDS system. I expect the forthcoming "MPS" system from Apple (which includes a C and Pascal compiler, as well as an assembler) to be the most popular environment, if it ever gets finished.

(Bob Abeles) What delights do you have in store for us?

(Andy Hertzfeld) Well, I'm trying to take it easy this summer. I'm currently working on a double-sized cursor hack for some near-sighted MAUGers who requested it. I'm planning some major enhancements to Switcher in the fall (disk-based partitions) and a few other things that are too ephemeral to talk about now.

('Bill C/Alt) There has been much speculation about the next version of the Macintosh having a 68010 or a 68020 Processor. Comment on the possibility—and are these processors capable of being compatible with the 68000 (upward)?

(Andy Hertzfeld) Exception handling is different on the 010 and 020, so there can be some compatibility problems. The new (128K) ROM will be compatible with both the 010 and 020 but everybody's applications may not be. The truth is that Apple has at least three candidates for the "next Macintosh" under development so it's hard to say which ones will be for real.

(Mike Ginsberg) Andy, I now have a 128K Macintosh and would upgrade to 512K IF the Switcher would allow me to do multitasking.

Any possibility of me upgrading my Macintosh in the near future?

(Andy Hertzfeld) The Switcher supports a limited form of multitasking; applications have to be modified to take advantage of it. The new version of ThunderScan can scan in the background under Switcher now. You should want to upgrade for more important reasons than that, though.

(Keith Esau) Is there any way to create or plan to support .MAP files from Lisa Pascal for use with MacDB?

(Andy Hertzfeld) Sure, it's certainly possible. You'd have to write a translator to pull the symbols out of the ".OBJ" format into the ".MAP" format. Since both formats are fairly simple and well documented, it wouldn't be hard, BUT Apple is working hard on their own new development environment that will have a symbolic debugger that's not compatible with either format, so maybe it would be a waste of effort .

(Dennis Alvernaz) Andy, what performance in speed is probable with new ROMS and where?

(Andy Hertzfeld) The resource manager is the single place that was speeded up the most. Believe it or not, but QuickDraw was significantly speeded up, too, as well as a bunch of other places. It's difficult to say since every application does things a little differently, but new ROMs coupled with the new 3.5-inch drives cut application launch time at least in half, usually more.

(Eric Zocher) Two Q's: 1) Can you reveal any specifics about the contents of the additional space in the new ROM(s)—will system resources like Chicago font, MDEFs, WDEFs, CDEFs be in silicon? 2) Do you know when and how info will be available about the new hierarchical file system? Will Software Supplement purchasers be getting a new file manager chapter of IM? THANKS in advance!

(Andy Hertzfeld) The new ROM isn't frozen yet, so things are subject to change, but I would expect the Chicago font (but no other fonts), WDEF 0, MDEF 0, CDEFs for buttons and scroll bars and most of the PACKS to be in the ROM. Info on the new file system should be available to developers through the normal channels pretty soon. The new file system is compatible with the old except for people who follow the FCB list (the FCBsize is different) or read the directory themselves. Most software will run just fine because the "vRefNum" will mean the working directory instead of default volume.

(Tim Pulling) Will there be an upgrade to replace the internal drive with a double-sided drive? I've heard there might be heat considerations. Thanks.

(Andy Hertzfeld) Yes, there will be an upgrade to replace the internal drive. It will be optionally bundled with the new ROM so you only have to open the Macintosh up once. It will be available in the same time frame as the new ROM.

(Tom Mackie) Andy, much has been reported—especially on ARPAnet—as to power supply/overheating problems. Can you comment? And do you indeed run your Macintosh with the cover off?

(Andy Hertzfeld) Apple is pretty careful about testing things like that, but it's always possible to get a bad batch of components in and have it slip through quality control. Before I got my Hyper, I used to run a Macintosh without a cover, but that had nothing to do with overheating; I was diddling around with the hardware a lot, so it was more convenient to leave the cover off. I did get a bad electric shock once; I wouldn't recommend it.

(David Jacobs) Will there ever be an Apple ProFile™ that can hook up to both the Macintosh and Apple II?

(Andy Hertzfeld) I think the new 20Mb external drive from Apple will be capable of doing that, since it interfaces through the IWM, which is common to both Macintosh and the Apple II. All it would take is a driver for ProDOS® and probably some ProDOS -> Macintosh conversion software that I think they're already working on. One of the advantages of the recent reorganization is that things like that should be much more likely to happen.

From: Robert Woodhead <Y.AJAJ-Woodhead-ROBERT%CRNL20A.BITNET@Berkeley>
Subject: Some helpful tips from a developer (LONG!)

Here are some handy code fragments you may want to use.

First, to introduce myself, I'm a MacDeveloper who has been working on Macintoshes since before they were announced, and I have just put my first Macintosh product (Wizardry) into Beta test after 18 months of development. Along the way, I've developed some code fragments that are extremely handy to use (in Lisa Pascal) and so I'm going to pass them on in this and future postings. Due to the rather strange network linking here at Cornell, I have to send them to the INFO mac people to get them posted to the net.

So, now on with the show...

Centering Dialog Boxes.

Making things look nice on an XL. One nice trick is to make all your dialogs with the user come onto the screen centered (or adjusted) when the user is on a Lisa. This means that dialogs that are centered on Macintosh are centered on the Lisa screen as well. The following routine adjusts a rectangle proportionately when running on a nonstandard screen. It has two global vars, scrX and scrY, which are the number of dots across and down.

```
PROCEDURE DoAdjust(VAR R:Rect);
VAR X,Y,Xd,Yd:LongInt;
BEGIN
IF (scrX=512) AND (scrY=342) THEN Exit(DoAdjust);
Xd:=(R.left-R.right) DIV 2;
Yd:=(R.bottom-R.top) DIV 2;
X:=(((R.right+Xd)*scrX) DIV 512) - Xd - R.right;
```

```
Y:=(((R.top+Yd)*scrY) DIV 342) - Yd - R.top;
OffsetRect(R,X,Y)
END;
```

Next, to make things a little more convenient when doing dialogs, we define DoShowDialog, which takes a new dialog (which should be defined as inVisible!), moves it, makes it visible, and shows it.

```
PROCEDURE DoShowDialog(Dptr:DialogPtr);
VAR R1,R2,R:Rect;
BEGIN
R1:=Dptr^.portBits.bounds;
R2:=Dptr^.portRect;
R.top:=-1.R1.top;
R.Left:=-1*R1.left;
R.right:=(R2.right-R2.left)+R.left;
R.bottom:=(R2.bottom-R2.top)+R.top;
DoAdjust(R);
MoveWindow(Dptr,R.left,R.top,True);
ShowWindow(Dptr)
END;
```

Oh yes, in dialogs, when you want to put the nice bold box around a button, assuming R is the rectangle that contains the button, then

Bold Button Boxes.

```
PenSize(3,3);
InSetRect(R,-4,-4);
FrameRoundRect(R,16,16);
PenSize(1,1);
```

will do the job nicely.

Are you having massive memory bombs on a 128K Macintosh?

The Nasty Segment Loader Gotcha. This bug only hits very large programs with lots of segments, where you keep only parts of the program in memory at a time. When a segment is loaded off disk, it is placed as low in memory as can be done (which is great). When it is UnLoadSeg'd, it is free to float around memory OR be purged. BUT!! When it has been UnLoadSeg'd and is still in memory, and the Segment Loader is called to load it, it says "oh, here it is, let's lock it in place"... Can you say "heap fragmentation" boys and girls? I knew you could. Apple Tech Support earned $50 worth of cookies fixing this one with a special patch to the loader. So if you are having massive memory bombs on 128K Macintoshes, check with them for the LSinstall and LSremove patches.

The penalty for clippping is ...

Oh where, oh where did my picture go? Let's say your program uses "pictures," the way of recording QuickDraw calls so that they can be replayed. One nice feature of pictures is that they can be shoved into the Clipboard and then moved into other applications (or the Scrapbook). The problem is that this doesn't work—you paste into MacWrite and get a blank area! The problem is that MacWrite/Paint, and many other applications look at the Clipping REGION to determine the size of the picture, not the Clipping RECTANGLE. And since that region is set to a huge rectangle, your painting is done 50 feet or so off the screen and in the air. To make

MacWrite/Paint accept your pictures, you just set the ClipRegion to be the portRect while painting, and reset it after the closePicture.

The big switch. Switcher is, by definition, something of neatness. But your program must know how to behave in order to get along with it. This becomes even more important when you are going to allow multiple copies of your program to coexist. Anyone who has the BETA Switcher documentation knows how to use Suspend and Resume events in order to tidy one's own house, but the real problem with multicopy environments is initialization. If your program does some data file initialization, especially on SHARED files, then it might get understandably upset if another clone of itself overwrote the initialization with another initialization.

Here is how to detect, given that you know the file name of the application, whether you are the first invocation of your program. At location $642 (hex) is the Switcher World Table Pointer. If it is 0 or -1 then you are not running under Switcher. The world table is a list of eight pointers to heap prefixes, one per application. The first longword in the heap prefix is a handle to the information record. Starting 344 bytes from where that handle is pointing is the Application File Name string. This string is set when Switcher regains control from the startup of an application. So if you are running Switcher and cannot find your file name in these data areas, you are the first copy of your program to be started.

When using Switcher, be careful about closing files.

The file's the thing, wherein we'll catch the conscience of the King. Another little Switcher GOTCHA is that if you have multiple copies of a program running that access the same file, they can all open it, but when one closes it, it becomes closed for ALL the copies! Therefore, when multiple copies share files, it's a good precaution to close them on a suspend event, and reopen them on a resume.
P.S. The locations used by Switcher are guaranteed by Andy not to change. They will be more fully defined later on, according to him.

What have they got against broadcasting? One of the neat features of AppleTalk is broadcasting, wherein a single node can send a message to all the other nodes. This has to be done at the ATLAP protocol level, and is extraordinarily useful for writing games. The problem is, you don't want to interfere with other applications, and since there are only 256 "protocol numbers" in ATLAP, your game could mightily bugger up an innocent application that uses the same number as you chose. Apple has reserved some of the numbers for their own use, for example for the use of NBP, the Name Binding Protocol. Yet they REFUSE to set aside a protocol number or two for broadcast applications. If they did this, then all applications that wished to broadcast would use the SAME number. The first four bytes of each message would be a signature (hmmm.. where can we get unique signatures that are four letters long, you wonder) that would allow applications to throw away broadcasts that are not meant for them. It's a simple solution, but Apple won't consider it because they think that broadcasting is a bad idea. They ought to notice that a game with N Macintoshes playing has a message traffic proportional to N under broadcast, but N*(N-1) in some cases when you have to

address messages to specific nodes. And anyone who thinks that you can =roundrobin= the messages should think again, it doesn't work and still increases average message size.

Hope these are helpful tips, more later...

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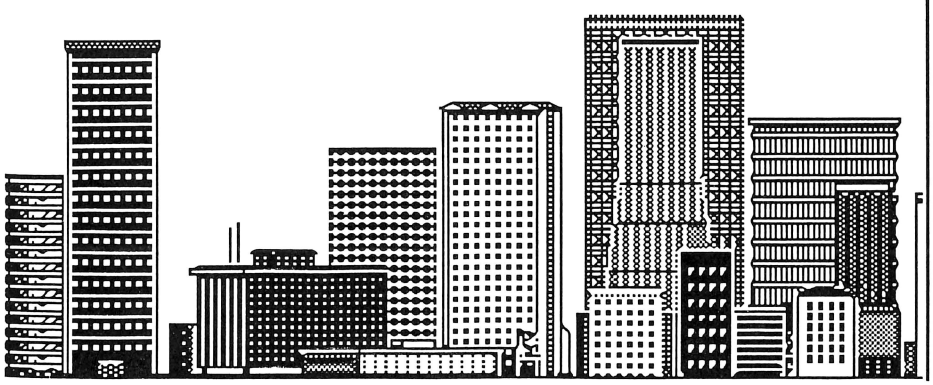
PLATO : ROBERT J WOODHEAD/ORANGE07/PCA

"There are two types of people in this world, Those who divide the world into two types of people, and those who don't..."



International

APPLE INTERNATIONAL UNIVERSITY CONSORTIUM CONFERENCE

Cambridge University in England will host the first International Consortium Conference from March 23 to March 26, 1986.

March 23-26, 1986

In March, Apple Computer will sponsor its first international Apple University Consortium Conference in Cambridge, England. This meeting brings together for the first time consortium members and educators from around the world.

The meeting will provide a forum for the exchange of ideas, information, and experiences among international consortium members and will help to further the consortia's goal of optimally utilizing Macintosh for academic research and development.

The three-day event will feature presentations by various consortium members, a third-party exhibit of Macintosh products for the education market, and demonstrations of software and products developed by member institutions. There will be opportunities for informal hands-on experience, as well as presentations by task forces, and seminars addressing areas of common interest.

The opening ceremonies will include an address by John Sculley, Apple's chief executive officer. Attendees will come from around the world, with representation from Asia, Australia, Europe, Canada, Latin America, and the United States.

Perhaps we can create an international network of educators.

With more than 20 countries and 70 institutions represented, this is an excellent opportunity for educators to meet with each other, share ideas and successes, and work together to strengthen the consortia and build an international network.

A report on the first international consortium meeting will appear in the next edition of *Wheels for the Mind.*

Program GRAPH 4.0

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Program **GRAPH** is written in Microsoft BASIC Version 2.0 for the Macintosh, for the input, editing, display, and processing of two-dimensional or x-y data.

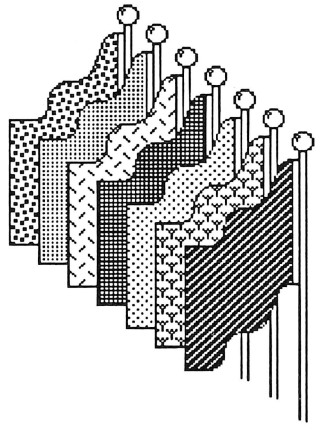
GRAPH 4.0 is the version for linear regression analysis of x-y data; other versions will allow polynomial least-squares fitting, nonlinear least-squares fitting and other special application data analysis procedures. The present version is set up assuming a Macintosh 512K, but cutting down the dimension definitions for data can reduce this to fit into 128K.

This application facilitates the input, editing, display, and processing of two-dimensional data.

Like all good Macintosh programs, it is designed to require the minimum time for the reading of manuals. Hopefully, most bugs have been removed in the past few months of use in our laboratory. Using the deactivation of menu options and so on has eliminated most traps for young players who might try to carry out operations in some illogical order, for example. If you find a problem, then please let us know.

The program comes as an uncompressed, unlocked listing so that you can see the way in which it does its tricks; as it comes, it works well. Of course, when there are ways in which the program can be improved or tailored to your particular needs, you should feel free to do so, but once you have modified it, it becomes your problem.

We have provided the program on your disk, rather than make it generally available through the public network system, so that we can keep in touch with who the users of **GRAPH** are. If someone else likes that look of it, then please ask them to post a disk to us, so we can send them the latest available version of **GRAPH** and add them to our list of contacts.



A *brief* users' manual for **GRAPH**:

MENUS

FILE

Open produces a standard dialog box to open an existing file of **GRAPH** data. The file could be produced using another program, but should have the format :

line 1 :	GRAPH
2 :	a line of comment
3 :	another line of comment
4 :	x value descriptor
5 :	y value descriptor
6 :	points, the number of data pairs that follow
7 :	the first data pair, x(1), y(1), yerror(1)
8+points :	the last data pair

Append allows x-y data in another file to be added to the existing data set to combine data sets for analysis.

Save As... produces the standard dialog boxes to save a data set as a disk-based file.

Quit drops out of **GRAPH** and back to BASIC.

EDIT

Cut, Copy, and Paste have the usual functions for sending data to or retrieving it from the Clipboard. This can have trivial application in the editing of edit fields and so on, but is most used for storing graphical output from **GRAPH** where it can be picked up and stored in the Scrapbook for later incorporation into a MacWrite or MacDraw document. **GRAPH** output is a sequence of graphics commands, so any MacDraw-type program can interpret it.

DATA

New data allows input from the keyboard of a set of data points. It *overwrites* any current data set. Data points are presented in a viewing window. Data is input in a dialog box with edit fields for point number, x,y, and error in y.

Add data adds new points to an existing list. On entering this option, the entry box is set up for the 'points+1th' point.

Examine data sets up the data list at the first data point. Data can be examined in the viewing window and edited by operating on the edit fields in the data entry box. If there are more data than can be displayed at once in the window, the data pair defined by the edit fields is centered in the window.

To change or correct a data pair, enter the point number in the field, press Return, then edit x, y, or error as required; Return is required to

execute each change. A data pair can be removed from the set by clicking the Remove Pair button.

Sort orders that data by increasing or decreasing x or y as checked in the dialog box.

Hard copy table dumps a table of pair number, x value, y value, and y error to the ImageWriter.

DISPLAY

Display grid presents a box with current settings of the grid marks, axis labels, and so on required to define the grid for plotting. Default values are chosen to enclose the present data set, but particular values can be set for your own reasons (to compare different data groups on the same grid for example).

Display points allows a number of plotted point styles chosen according to taste, or to distinguish data groups.

Display fit draws the line of best fit as calculated using the least-squares procedure in the process menu.

Join points draws a straight line between successive data points. Unless you have a good reason for not doing it, make sure that the data points are sorted into increasing or decreasing order.

Plot to ImageWriter dumps the screen image to the ImageWriter, with options to include all or some of the grid, the points, the fit, and the fit details.

Plot to Clipboard sends the screen image to the Clipboard where it can be picked up by the Scrapbook for transfer to another application.

Digitize presents a new cursor and returns the (x,y) coordinates anywhere in the grid area when the mouse is clicked.

PROCESS

Linear least squares calculates the line of least squares best fit to the current data. The data points will be given equal weight if the unweighted button is checked; they are weighted inversely according to their magnitude if statistical weighting is checked; or weighted according to the inverse of the errors in y if these were input under the data menu and the instrumental weighting button checked.

Calculate y for a given x does what it says; obviously it only has meaning if a fit to the data has been calculated.

Calculate x for a given y ... well!

Transform allows the data to be tranformed to a variety of functions of the data. A data buffer, z, is loaded with the x or y data as checked, transformed according to any of the eight functions available, then sent back to x or y as the transformed data.

Add user defined function is a powerful feature of the program. A user-defined function, or UDF, is a GOSUB segment of BASIC program, set up by the user as a special procedure for the analysis of x-y data; iT can be a simple function that's not available in the standard tranformation functions above, or it can be as complex as the user thinks necessary. Only one UDF can be part of GRAPH at any one time, but it can be replaced by a new one as required.

The only limitations on a UDF are that it should begin with the label udfstart: and end with Return followed by the label udfend: ; of course it also has to be valid and sensible BASIC.

The UDF can be added into the program from the keyboard if it is a simple one-line function, from the Clipboard, where it has been copied from say Mockwrite or the Scrapbook, if it is a more complicated function, or from the disk if has been created previously and stored as a disk file.

An example of a UDF to transform x to the product of x and y is the file UDFsample :

```
udfstart:
FOR i = 1 TO points
x(i) = x(i)*y(i)
NEXT i
RETURN
udfend:
```

Show user defined function produces a window showing the listing of the UDF part of GRAPH to confirm that it is what you think it is.

Execute user defined function transforms the data or does whatever else the UDF has been programmed by the user to do.

INFO_

About GRAPH is a station identification and minor advertisement for the authors.

Memory specifies the current usage of memory space. You might use it as a guide to redefine array dimensions or strings if memory is getting tight.

GRAPH was written by Tony Campisi and Mike Grace in the Department of Inorganic Chemistry at the University of Melbourne. Enquiries should be directed to Dr. Peter Tregloan in that Department.

Mathematical Fonts

Australian National University

ANUMath1

A large number of mathematical, scientific, and Greek fonts are available.

This font is based on Monaco, a fixed-width font, and has a large number of mathematical, Greek and scientific characters. For scientific word-processing, major requirements are horizontal and vertical cursor control for overprinting and construction of complex formulae. A true nondestructive backspace is not possible in MacWrite; however this font provides:

- A large number of characters that overprint the following character.
- Zero leading, so that multiline characters can be constructed.

Monaco is not a particularly elegant font, but overprinting in a proportional font such as Geneva is not very satisfactory. However using the Command-key feature described below, it is quite convenient, and indeed rather effective, to mix Geneva text with ANUMath mathematical symbols (cf. the standard use of italics). A 1-dot-wide space is provided for matching up characters on successive lines when mixing with proportional fonts.

[NB There are minor differences from the earlier ANUMath font, mainly improvements to character shapes; however two characters have been replaced, and four moved. Therefore this font has been provided with a different ID number.]

ANUMath2

This font provides superscript and subscripts of all numeric and standard alphabetic characters. Partly this is to overcome MacWrite's habit of changing line height in superscript mode (and losing superscripts when the style is changed!); it also provides for a second level of superscripting. Note however that ALL these characters overprint, so superscripts directly over subscripts, and some large fractional formulae should now be possible. Some more scientific characters are provided, including an improved integral sign, and characters to form 2- , 4-, ...line braces, and horizontal braces.

It may take some practice to use overprinting characters in complex combinations; it is very easy to lose track of which character the cursor is pointing to. A couple of hints: Sometimes it is best to put in overprinting bars, tildes, and so forth, after the plain-text main character, by repositioning the cursor; also, in trying to correct a complex character combination, select the whole mess, change font to ANUMathA or ANUMathB (see below), so the characters separate out, correct, and change back.

ANUMath1 and ANUMath2 are provided in 12- and 24-point sizes, for high-quality printing (24-point bold makes excellent transparencies).

Spacing between characters and shapes may not always match precisely for the two sizes; also because of the vagaries of size conversion from 24 point, sometimes the standard printed character looks better than the high-resolution one! Note that sometimes in 24 point and when placing superscripts on superscripts, part of the character may not appear on the screen; it should print correctly, however .

Warning: Don't try to edit ANUMath1 or ANUMath2 using the Font Editor (it will hash the fonts) or the Resource Editor. If you want to modify these fonts, use the Lisa Workshop REDIT (if you know what you are doing), or Macintosh FEDIT (if you *really* know what you are doing).

ANUMath3

This font (12-point only) provides a number of arrows for constructing mathematical diagrams. Still under construction.

After these fonts were designed, it was found that a peculiar bug seems to exist in the NEW (ImageWriter15) printer driver routines: *If an overprinting character is typed, and then the font or the style is changed for the character to be overprinted, it appears correctly on the Macintosh screen, but* sometimes *(!) the overprinted character is not printed.*
This is nasty; for the moment, the following seems to be a fix:

Between an overprinting character in one font and an overprinted character in a different font or in a different style, always place a 1-dot space (Option-Shift-1) in the first font.

This seems to work, although it is unwieldy, and leads to multicharacter combinations breaking up. If a better solution can be found, we'll let you know.

Alternatively, if you don't need to use the admitted advantages of the new driver, use the old driver (ImageWriter9). It would be nice if you could switch between the two printers, using the Choose Printer desk accessory, but the new system resource doesn't seem to be entirely compatible with the old driver: italics are printed with different character widths (presumably to fix a bug). Since this alternative seems the best for the present, *the old driver has been installed on the present system, and the above "fix" is not necessary.* If you want the new driver, you should install it with the Install Printer utility. (Sorry, no plans yet for a LaserWriter version of the fonts). By the way, the fancy new Key Caps works well with these fonts, except for the characters hidden in the Option-combination keys; however, it does NOT work with MacWrite 3.4. You should be aware MacWrite 4.5 has a bug that is most likely to occur in documents with lots of style changes.

Command Key Feature

By a dirty trick, we can fool MacWrite and MacDraw into accepting Command-key equivalents for changing fonts between Geneva (Command-0), ANUMath1 (Command-1), ANUMath2 (Command-

2),ANUMath3 (Command-3), ANUMathA (Command-4), and ANUMathB (Command-5); this is a great convenience. It is done by using dummy fonts, which are not recognized by the Font Mover; so if you want to move ANUMath to another system and wish to retain this feature, use the Resource Mover to install them—by judicious use of Copy and Paste, you can make the fonts appear in the menu in suitable order ("last in, first out").

ANUMathA , ANUMathB

These are the same as ANUMath1 and ANUMath2, except that the overprinting feature is turned off. This is useful for constructing and editing complex combinations of overprinted characters, and ANUMathB is easier to use for subscripts and superscripts. You may have no need for ANUMathA or ANUMath3, so you could delete these fonts (they take up a lot of room). Some people may in fact prefer the nonoverprinting versions (although in that case, the mathematical font Princeton, which is based on Geneva, might be a better choice).

Font Numbers used are 31, 32, 41, 42, 43, 50, 51 ,52, and 53.

Geneva+

This font, designed at Princeton University by D.E. Dougherty and S.H. Lam for noncommercial use, within the Apple University Consortium only is an enhanced Geneva—that is, it is standard Geneva plus a number of graphics characters (12 and 24 point only). It has the same ID as standard Geneva. [The present version is slightly modified, in that two space characters have been changed to conform with the ANUMath fonts, and the leading has been set to zero so that multiline characters will not break up: it is best to use single or double line spacing to enable multiline characters (which must be in single line) though "6 lines per inch" can be useful for improved spacing of summation indices.]

Sources

If you like the ANUMath fonts, please send $5 to the address below. We will keep you informed of improvements and modifications, and try to sort out any difficulties. [Above applies to University Consortium members: others please contact me for access to the nonrestricted items].

Dr. N. Smythe
Mathematics, Faculty of Science
Australian National University
Canberra ACT Australia

Revised List of University Consortium Members in Australia

Consortium members in Australia.

- Wollongong University
- University of Tasmania
- University of Western Australia
- Western Australian Institute of Technology (WAIT)
- University of Adelaide
- The University of Melbourne
- NSW Institute of Technology
- Australia National University (ANUTECH)
- Sydney University
- New South Wales Institute of Technology

Call for Assistance

Geologists call for assistance.

Several geologists in the Department of Mines and Energy of the Government of Newfoundland and Labrador are looking for some specialized software to run on Macintosh microcomputers.

In particular, they would like to know if any ***Wheels for the Mind*** readers have any information on the availability of software in the three following areas:

1. Plotting packages that include contour plots, 3-D surface plots, and plots of kriged data.

2. Statistical analysis software that would include cluster analysis, discriminant analysis, and factor analysis.

3. Geological software including petrological calculations (Norms), ore reserve estimation, and geophysical modeling.

Please contact RanDy Miller, Project Geologist, P.O. Box 4750, St. John's, Newfoundland, Canada A1C 5T7 Telex : 016-4724

Economic Simulations

Paul Wodding
Department of Economics
University of Otago

These programs are written in Microsoft Basic 2.0

MOFSIM 0.5 is a direct translation from an Apple / / version of Minister Of Finance Simulation. It should be regarded as a preliminary Macintosh version as it makes rather modest use of the

Macintosh interface. Future versions will feature a wide variety of reports and graphs on the performance of the model economy, and will make extensive use of Macintosh features.

MACRO MODELLER is a very simple version of a major software development on which I have started. Eventually a full theoretical macroeconomic model will be made available for student practice. Students will be able to vary a number of parameters to enable them to explore the relationship between algebraic and graphical models.

A macroeconomic model is being developed.

Playing MOFSIM. The MOFSIM model sets up an economy rather like New Zealand and allows you to act as Minister of Finance. MOFSIM 0.5 (model 5 in a series of models) is a relatively advanced model designed for Economics 2 and, to play it well, one needs to understand a fair amount of economics. It is possible, however, for a non-economist to make a reasonable job, given that most of the jargon involved is widely reported in newspapers.

The Minister of Finance may choose his policy objectives, e.g., to cut the level of unemployment, and must decide what policies he will use: fiscal policy (an increase in government spending, or a cut in the income tax rate), or monetary policy (an increase in the money supply). Carrying out such a policy change in the first quarter of the twelve quarters (three years) for which you are Minister of Finance, you may observe from the statistical report and graphs that there are side effect of your policy manipulations. The balance of payments responds adversely under a fixed exchange rate, and the budget deficit worsens if you use "expansionary" fiscal policy. Interest rates will rise in the fiscal policy case (but fall if you use expansionary monetary policy), and rising interest rates will "crowd out" spending elsewhere in the economy. In the longer term the rate of inflation may rise and erode the impact of your original policy changes. All of these effects are important in the teaching of macroeconomics.

Playing Macro Modeller. The first version of Macro Modeller doesn't do anything very impressive. Given the mathematical weakness of many of our students in economics, however, even plotting a linear function poses some difficulty. Macro Modeller gives you the opportunity to vary the intercept and slope of a "Consumption Function" and to observe the way in which the function shifts or swivels. Given the debate in economics over the steepness of short and long-run consumption functions, the excercise is not trivial: it gives students a firm impression of the shape of the function for varying assumptions about its slope.

Canadian Consortium Update

The following schools are members of the Candian Consortium. A full list of addresses and contacts will appear in the next issue of **Wheels for the Mind**. In addition, there will be a description of some exciting projects going on at the University of Waterloo.

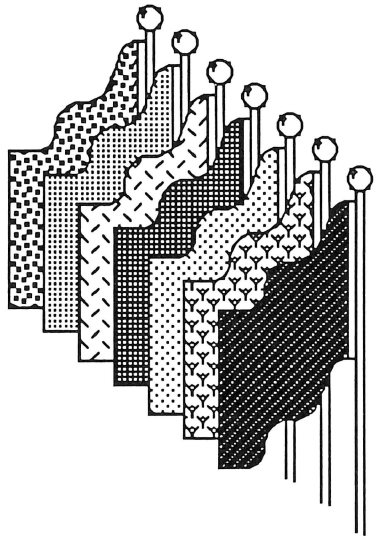
Look for a description of Canadian activities in the next issue of Wheel for the Mind.

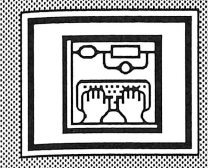
University of Montreal
University of Toronto
York University
University of Alberta
University of Manitoba
University of British Columbia
Simon Fraser University
L'Université du Québec A Montréal
McGill University
University of Calgary
University of Victoria
Concordia University

New contact.

In addition, please note that the new International Contact at Apple Canada, Inc. is Pat Micallef. Pat is the National Manager, Education Program, and can be reached at :

785 Don Mills Road
Don Mills, Ontario M3C 1V9
(416) 444-2531
Telex 06-986561





Technical Development

MacApp™—The Expandable Macintosh Application

By Larry Tesler

Most programmers developing Macintosh applications have found it difficult to implement every detail of the standard user interface. For example, although the toolbox provides routines for moving and resizing windows, application code must call those routines in response to user actions. The toolbox also leaves to the application much of the responsibility for scrolling, printing, menu management, Clipboard and desk accessory display, and a host of other details.

MacApp is a prefabricated application.

MacApp is a prefabricated application that handles common user interface details generically. In addition, it facilitates the implementation of AppleTalk communication, filing, error checking, and many other application responsibilities.

MacApp reduces application design time.

MacApp reduces application design time by providing a standard architecture that makes certain design choices compelling. For example, there are numerous ways to organize a program to implement the "Undo" command. MacApp provides a standard approach that is known to work well. For each command, the application programmer defines a "command object" that implements the procedures DoIt, UndoIt, and RedoIt. The DoIt procedure must maintain enough state that the UndoIt procedure can reverse the action of the command. MacApp invokes the right procedure at the right moment, and manages auxiliary details, such as changing the menu command from "Undo" to "Redo," making sure the correct window is active before calling UndoIt, and freeing the command object after the command is no longer undoable.

Prefabricated applications sometimes overly restrict the programmer or add execution overhead. Because MacApp is implemented in an object-oriented language that features inheritance, the programmer can override its generic behavior at will, make nonstandard design choices, and add application-specific behavior. Because the language is compiled—not interpreted—no performance impact is evident.

A beta release is planned for early Spring.

MacApp is now in alpha-release. Beta release is planned for early spring, and final release later in 1986. Each release adds functionality and documentation and improves performance and code size. In addition, the development system alternatives for the three releases are different, as follows:

Alpha: Pascal only—Lisa Workshop cross-development

Beta: Pascal and Assembler—Macintosh native development

Final: Pascal, Assembler, C—Macintosh native development

MacApp can be used to write integrated applications, or to write separate applications running under Switcher or alone. It can not be used to program desk accessories.

Several companies and universities have been testing early versions of the Expandable Macintosh Application since March 1985. At least two companies have announced and demonstrated significant vertical-market products developed using it. They have found that MacApp reduced their development time substantially, and that it made it easier to adhere to the user interface guidelines. We anticipate that MacApp will become an important tool for both vertical-market and university developers during the coming year.

Developers interested in obtaining MacApp should send a 3- to 4-page proposal outlining the intended application to:

Apple Computer, Inc.
20525 Mariani Ave., MS 3T
Cupertino, CA 95014

The Apple Technical Library : The Official Publications from Apple Computer, Inc.

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INSIDE MACINTOSH

Published in three volumes, this is the most up-to-date version of the single work every Macintosh programmer needs.

Available January, Volume 1 $24.95, ISBN 0-201-17731-5
Volume 2 $24.95, ISBN 0-201-17732-3
Volume 3 $19.95, ISBN 0-201-17733-1
Three-volume set/hardcover $79.95, ISBN

0-201-17737-4

Miscellaneous Development Thoughts

By Jerry Keough
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KEOUGH@BCVAX3.BITNET

In the first issue of *Wheels for the Mind* last January, I wrote a note on development. I had wanted to experiment with the Lisa development system, and decided to implement a "student grading program" I had used for several years on various machines, most recently a VAX 11/780.

Looking back, the note I passed on had some good thoughts, but was largely based on a bad idea. Indeed, what I had done was violate many of the User Interface Guidelines...The last lines of the guidelines state specifically: "Don't ... take an old-fashioned prompt-based application originally developed for another machine and pass it off as a Macintosh application." What I wound up with was a "functional" application (it did almost everything I wanted) which had misnamed menu items, nonintuitive terms, little use of the mouse outside of selecting menu items, no graphics, and far too many "modal" sequences.

It takes a while to fully understand what makes a good Macintosh application.

When I talk about doing Macintosh programming now, I often pull out this program as an example of what *not* to do when writing a Macintosh application. I suspect that "the rest of us programmers" have taken this long (almost two years) to get used to understanding what constitutes a good Macintosh application.

Here's where my grading program is today—on the shelf. It has been circulated quite a bit, even to the point where I've seen it listed in a public-domain catalog from Sweden. I'm flattered, and I'm happy to acknowledge the several replies and phone inquiries I've received about it. I very much appreciate your support, and am grateful for the suggestions some of you have passed along for improvement of the program. I'm afraid, though, that version 0.96 is just not going to be updated in its current form.

What am I doing now in Macintosh programming? Well, guess what—I'm writing this wonderful student grading program. Except this time, I'm doing it differently in two main areas: I'm using a different development system, and I'm concentrating on the interface.

The Development System

The advantage of programming in Assembly is that you can do anything you want with the machine.

I'm programming "the hard way"—in assembly language, using Apple's 68000 Macintosh Development System (no quiche-eater here, folks!). The advantage of using assembly is that you can do anything you want with the machine. One disadvantage is that it takes a long time to "compile, link, run, and crash" [a phrase I've borrowed from Dan Cochran at Apple—it's his quick evaluation tool in measuring the success of most development systems]. A second disadvantage in

using assembly is that it's very difficult to debug. However, if you think clearly in assembly (I'm not an Andy Hertzfeld, but I do get around inside the machine all right), and if you have the right tools around (that is, you use Macintosh 512K or a 1-megabyte Lisa with a hard disk and/or some combination of a RamDisk and Macsbug), using assembly language is no worse than several of the development systems around today.

By the way, I got started on this project because I'll be teaching a new course at Boston College in the spring term called "Microcomputer Systems." It will really be a course on *Inside Macintosh*, and I will require students to use assembly language—largely because there are some topics I'll want to talk about (for example, writing a device driver) that can only be done correctly at the assembly level. As a preparatory exercise, I wrote out Stephen Chernicoff's "MiniEdit" application in assembly. I added font, type sizes, and printing capability to it, and the total source was about 100K. With resources, the assembled application is about 8K. I may very well assign this as a project in the course. [Incidentally, I recommend Chernicoff's texts, called *Macintosh Revealed*, especially Volume 2, for those of you who want to follow the development of a nontrivial Macintosh application from start to finish. It's not a substitute for *Inside Macintosh*, but it is a welcome companion].

Since I had all this assembly code lying around, I thought it might be fun (?) to redo the grading program. Much of the code I had written was "generic"; it had the structure of a complete application, but the details of how the screen must be drawn, how the mouse clicks must be interpreted, and the like had to be altered. I've been working on it for about a month now, off and on, and I've got an application that looks like a mini-Multiplan. I'm almost happy with the layout I've set up. I can keep things on-screen consistent with the internal data structures, and can handle clicks and drags in almost every case.

The User Interface:

Spend some time early in your design on precisely what should be contained in the menus of your application.

When I wrote my first grading program, I had all the code of a running application and tried to fit it onto the Macintosh. I defined the menus in terms of my previous prompts. Now, I'm more concerned with what goes in the menus at the outset, and how the screen presents the information. I've often sat down with pen in hand for an hour or two sketching out how items can be clearly and logically organized in menus. For example, I wanted my new grading program to allow sorting student records "by name," "by average," and "by alias" (for example, a social security number). I had thought about three different menu items for these. Instead, I decided on a single menu item whose text changes appropriately, based on the column in which the cursor is currently located. I've not only simplified the menu structure, but I've gained more flexibility, since now the item will also be changed to "Sort by Exam 1" when the cursor is in the column for Exam 1.

Last year, I kept putting off most graphics details, thinking I'd get them cleared up eventually. I wanted to get the program operational, and then fill in the user interface. This time, I want the user interface right. The program I have now isn't all that functional. So far, you can only enter names and grades. However, you can click and drag to

your heart's content and the program responds both correctly and appropriately.

I've gone out of my way to keep the application from becoming too modal. For example, in my first grading program, you entered a student's grade in a dialog box, but listed the student's grade in another window. If you then decided to edit the grade, up came another dialog box. Even though you could see the grade you wanted to edit, you couldn't edit it without going to another window to do it. My new program lets you edit anything you can see just by clicking on it, as any good Macintosh application should. Some morals from the story: you should be able to manipulate any object directly whenever it's visible; and you should avoid having the user see the same information in two different areas of the screen (it's both confusing and modal).

In closing, I'll admit that the program I'm writing is not exactly what the world needs right now. I'm really just a hacker plodding along, not a professional developer. Whatever I get out will not be much more than a specialized version of a Multiplan template, with limited applicability. I suspect there will be a market for it, though, since it will be cheap and you won't need Multiplan to use it. However, when it does get out, it will be clean.

I now understand why all the Macintosh software promised in January of 1984 was so late. It's easy to get a program that's functional, but hard to get a program that's intuitive and free-form with its interface. But aren't you glad the programmers took the time they did?

I now understand why many Macintosh programs arrived late.

Technical Notes

By Jerry Keough
Associate Professor of Mathematics
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I've collected some random notes on programming in assembly language, although some of the comments will be appropriate to *all* programmers. Here we go ....

1. Not in ROM. When I read *Inside Macintosh* (IM) and come to either of the phrases "not in ROM" or "Pascal only," I anticipate some careful reading ahead. IM is usually pretty good about noting what's going on for the assembly-language programmer in these cases; often, the steps the assembly-language programmer must take are spelled out carefully, and may actually be very easy to program. For example, the procedure SetDAFont in the Dialog Manager translates simply into a MOVE instruction with destination DlgFont in assembly. However, there are a few that require some work; some of these require special knowledge, and occasionally, one is misleading.

As an example of the first, consider the Standard File calls FSOpen,

FSRead, SetEOF, and a few others that implement high-level file I/O programming. The assembly-language programmer must read further into the File Manager to discover that it is his responsibility to set up the necessary parameter block in each case. I've constructed an interface in place of the Pascal interface so that I can mimic the Pascal programmer's convenience.

For example, FSRead could be implemented at the higher level by adding some low-level programming such as this:

```
ClearBlock  ; a utility to clear out the parameter block whose base is
                        at a6
            ; (i.e., it starts at -ioQElSize(a6) )

            movem.L     d0/a6,-(sp)
            move.w      #ioQElSize/2-1,d0
            ; count is # of words, less one
@1          clr.w       -(a6)
            dbra        d0,@1
            movem.L     (sp)+,d0/a6
            rts

FSRead      ; here, you push the file refnum, how many bytes to
                        read, and the buffer
            ; to which you want the bytes read - in that order. On
                        return, d0 will
            ; have the error code, if any, and d1 the number of
                        bytes actually read.

            link        a6,#-ioQElSize
            ; set up local parameter block
            movem.L     a1/d2,-(sp)
            ; save registers, as usual

            bsr         ClearBlock
            ; zero out the parameter block
            move.w      16(a6),-ioQElSize+ioRefnum(a6)
            ;move parameters to block
            move.L      12(a6),-ioQElSize+ioReqCount(a6)
            move.L      8(a6),-ioQElSize+ioBuffer(a6)
            lea         -ioQElSize(a6),a0
            ; point a0 to the parameter block
            _Read
            ; and do the read
            move.L      -ioQElSize+ioActCount(a6),d1
            ; # of bytes read
            movem.L     (sp)+,a1/d2
            ; restore the registers
            unlk        a6
            ; release local storage space
            movea.l     (sp)+,a0
            ; recover return address
            adda.l      #10,sp
            ; strip parameters
            tst.w       d0
```

```
                ; reset condition codes for exit
                jmp             (a0)
                ; and done
```

Now to do FSRead, you simply execute a sequence like this:

```
move.w      d7,-(sp)        ; push file reference number
move.l      #10             ; want to read 10 bytes
pea         ApplScratch     ; push address of buffer
bsr         FSRead          ; make the call
bmi         error           ; after branch, d0 has error code
```

As an example of the second kind of "not in ROM" call (the kind that requires special knowledge), I'll suggest an implementation of TEFromScrap (you can guess at the TEToScrap coding by seeing this one). It turns out that the Scrap Manager understands its scrapSize to be a long integer in Pascal (an assembly longword), but that TextEdit understands its TEScrpLength to be an integer (an assembly word). This fact eluded me for about two days when I needed to use it, and for the longest time I was confused by the message that the scrap was too big to save in the Clipboard! The assembly-language notes say all the right things, but don't point this out for you. Here's the code, although the error coding is not very strong (it just gives you a "no text in scrap" result)

```
TEFromScrap link        a6,#-4          ; need some
                                        stack space
            movem.l     a0-a1/d0-d2,-(sp) ; usual register
                                        save

            clr.w       TEScrpLength    ; assume a "no
                                        text" return
            clr.l       TEScrpHandle

            clr.l       -(sp)           ; room for
                                        function return
            clr.l       -(sp)           ; we're not
                                        getting the
                                        scrap yet
            move.l      #'TEXT',-(sp)   ; we want the
TEXT scrap
            pea         -4(a6)          ; a place to
                                        keep offset to
                                        text scrap
            _GetScrap                   ; make the call
            tst.l       (sp)+           ; get the length
                                        or error code
            bmi.s       @9              ; either error or
                                        no text

            clr.l       -(sp)           ; room for
                                        function return
            move.l      TEScrpHandle,-(sp)
                                        ; where the
                                        scrap will go
```

```
                move.l      #'TEXT',-(sp)       ; we still want
                                                    the TEXT
                                                    scrap
                pea         -4(a6)              ; room for
                                                    offset again
                _GetScrap                       ; make the call
                move.l      (sp)+,d0            ; get the length
                move.w      d0,TEScrpLength     ; make Long--
                                                    word
                                                    conversion
                                                ; needs help if
                                                    it doesn't fit !

@9              movem.l     (sp)+,a0-a1/d0-d2
                                                ; restore
                                                    registers
                unlk        a6                  ; dump local
                                                    variable
                rts                             ; and done
```

As an example of the third kind of "not in ROM" call (the kind that is misleading), look at the assembly-language description of "The ClikLoop Field." It says that "your routine should set register D0 to 1, and preserve register D2." Now, almost every routine that I write starts with a MOVEM instruction, just so I don't trash register values in my subroutines. The assembly comment was, in some sense, puzzling. I would expect that you should preserve register values except when noted. Why had IM gone out of its way to tell me that? When my ClikLoop routine didn't work, I kept staring at that comment, thinking that somehow it was related to my problems. It turned out that I had not preserved register A4 in my routine, and the ROM was expecting me to do it. Yes, I had trashed it, despite my telling you that I ALWAYS use the right MOVEM instruction. But IM lied (either it's a typo on Apple's part, or it's only a half-truth). In any case, I did enjoy single-stepping my way through the ROM with MacsBug to find the problem.

Every word of Inside Macintosh must be understood precisely!

2. *Read* Inside Macintosh *very carefully.* I now believe that *every word* of *Inside Macintosh* must be understood precisely; there are few phrases without significant meaning. Let me give you two examples of problems I had where more emphasis on some IM phrase would have helped.

The first example showed up when I wanted to write a simple program to do QuickDraw graphics on the Macintosh screen, wait for a mouse click, and then quit. The QuickDraw picture was easy (in fact, it was just doing the QDSample illustration in the Software Supplement in assembly), and then I just ran an eventloop to poll for a mouse click. Most times, the program ran correctly. But sometimes, the QuickDraw picture was drawn and then I got an "02 bomb."

Since I didn't use any windows, I never made an InitWindows call. It turns out that part of the Event Manager's data structures depends on the Window Manager's data structures. My GetNext Event call was crashing. Well, the fault was entirely mine—this is documented in the Event Manager manual in a separate assembly-language note. You

must set WindowList to 0, rather than call InitWindows. I think that when I *skimmed* through the section, I simply looked up the routine descriptions without carefully reading the text. Besides, I had used GetNext Event many times before, so why should I go back and read that section anyway?

The second example concerns the call to InvalRect. Its description starts with the simple statement: "InvalRect accumulates the given rectangle into the update region of the window whose grafport is the current port." That makes perfect sense to me, and that's exactly what I would write if I had done IM. However, the important phrase is "whose grafport is the current port." Before you call InvalRect, be sure that you've done a SetPort so that you're in the right place! It makes perfect sense: InvalRect only makes sense for some grafport (that is, window), and, by implication the only way is, that it applies to the current port. Unfortunately, when you get events in your application, you are sometimes in the Window Manager Port. Doing InvalRect there can cause some severe problems!

3. Dialog deactivation events. Although the thought I'll mention here has appeared in several places, such as in the source code of Cary Clark's "File" example in the Software Supplement, it is generally not documented in IM. When you call for a dialog with the user, you usually call for the window to be drawn, say with GetNewDialog, and then pass control along to the Dialog Manager with ModalDialog. The Dialog Manager then takes over all event handling for you. This is normally what you want—that's exactly what should happen when you're in a modal dialog. However, one thing that's been omitted is that the Dialog Manager doesn't send a deactivate message to your application (or, at least if it does, it doesn't let you process it). Consequently, your window still retains an active highlighting. In particular, any scroll bars you have are not deactivated. When the dialog is finished, it *does* send an activate message to your window, but your scroll bars don't get properly redrawn because they think they're still active and don't need redrawing.

The solution is simple. Everytime you call for a dialog window to appear, you first explicitly call for a deactivation event to be handled in your window. If you've done your coding correctly, this is nothing other than calling your "DoActivate" or "DoDeActivate" routine directly, before you call for the dialog.

Remember to do this when you call for other routines that invoke dialogs (such as several in the Printing Manager).

4. Separate resource and code files. In any development system you use, at some point you must join the resources you use with the code you've compiled or assembled. In almost every development system I know, this usually requires a separate pass of RMaker, Apple's Resource Compiler. Well, the fact is that my code changes a lot, but my noncode resources don't. I put all my resources on the disk into a separate file. My code executes an OpenResFile call when it starts up. That way, I only need to assemble/compile the code, without having to make a time-consuming RMaker call to rebuild what can be a lengthy jump table.

Avoid lots of global variables.

5. General programming comments (Warning: Philosophy here). I think one of the worst things you can do in any large program is have lots of global variables. I've done a lot of Pascal programming as well as assembly-language programming, and the comment applies in both cases. I prefer to have only a few globals, passing descriptive parameters to subroutines. Whenever possible, keep the number of parameters passed to routines to a minimum, as well. Thus one strategy in writing subroutines is to pass as little information directly as possible, and let the subroutine discover its full parameter list through some lookup procedure.

The specific example I have in mind is this: Suppose we want to write a multiwindow text editor, using all one font and all one size in each window. Each window is to have a scroll bar, as well as its own text font, text size, TextEdit handle and so on. One strategy (exemplified in Chernicoff's MiniEdit routine in Volume 2 of *Macintosh Revealed*) is to keep a collection of global variables called TheControl, TheText, and so on to hold a handle to the current window's scroll bar, the current window's TextEdit handle and so forth.

This approach simplifies much of our programming, because few parameters (if any) are now passed to the subroutines we call. However, it complicates other aspects of our programming, because we must continually validate the global variables, making appropriate changes to them as various windows are activated and deactivated.

In most cases, we can write our subroutines based not on a collection of global variables but on one or two key global variables or parameters. And we need not pass a collection of parameters when only one is sufficient.

In the current example, if a subroutine needs a window pointer, a handle to its TextEdit record and a handle to its vertical control, it need only be passed the window pointer. The subroutine can discover its vertical control from the window list associated with the window, and—with proper data structuring—can discover its TextEdit handle from a datarecord kept with the window using its RefCon field. Said another way, if the subroutine is given a controlhandle, it can discover the window it belongs to from the contrlOwner field of the control record, and then the TextEdit handle from the window's RefCon field. I think it's worth the effort for a subroutine to discover the collection of its parameters from one or two key parameters, rather than either overload on the number of parameters passed or the number of global variables kept.

Further, when you program in assembly language and start using the LINK and MOVEM instructions along with the strategy outlined above, you can start writing subroutines that create and use their own local variable space and are reasonably "transparent"; that is, they work correctly with the specification of only one or two key parameters, independent of the environment in which they are executed. The "structure" that this brings to your program will rival that which is normally available (but, alas, not always used) in Pascal.

The net result of the strategy is twofold. First, your code is easier to debug. Since your routine uses few, if any parameters, it is easier to verify both its invocation and its effect. Second, your code becomes transportable to other situations. Having implemented a subroutine once, you can just drop it into the next application you write as it is, without worrying about the environment in which it is used.

Reading MacPaint from Pascal

By Steve Stein, THINK Technologies

"ReadPicture" reads MacPaint-format picture files from a Pascal program.

Jon Hueras of Think Technologies has written a Macintosh Pascal program, "ReadPicture," that reads MacPaint-format picture files. However, some background on the MacPaint program is necessary before going into the details of this "ReadPicture" program.

On the Macintosh, a MacPaint picture file is stored as a compressed bit map of an 8-inch by 10-inch page image. Since there are 72 pixels per inch, this 8-inch by 10-inch rectangle represents 576 by 720 pixels. In memory, a pixel is equal to one bit; thus, this rectangle contains 414,720 bits, or 25,920 16-bit integers.

With that information, we can now explore the "ReadPicture" program. Initially, the program sets up the output drawing environment; it hides the windows, sets the drawing rectangle to fill the screen, and shows the drawing rectangle. The program then prompts for the picture file that we wish to read.

After reading in the file name, the program reads and decompresses the picture data from that file in the following manner. The first blocks of picture data are read into an input buffer, "Buffer," which comprises of two 512-byte halves, Buffer[1] and Buffer[2]. "ReadPicture" decompresses the data from "Buffer" into the 25,920-integer array, "PicBits" (the picture bit map) in a loop, decompressing one row of the picture at a time. Remember, from the dimensions of MacPaint pictures above, this is 576 bits, or 72 bytes at a time, and therefore, looping for 720 rows.

To decompress the picture, it is necessary to use "UnPackBits," a routine from the Macintosh ROM. The Pascal definition of this procedure is as follows:

procedure UnPackBits (**var** srcPtr, dstPtr: Ptr; dstBytes: INTEGER);

"srcPtr" points to the source (the data to decompress), "dstPtr" points to where the decompressed data will go, and "dstBytes" points to the number of bytes (of decompressed data) to process. "SrcPtr" and "dstPtr" are incremented by this routine: "SrcPtr" by the number of compressed data bytes processed, and "dstPtr" by "dstBytes."

An "Inline" call is necessary to access this routine from Macintosh Pascal. The proper "inline" call is this one:

InlineP($A8D0, @scrPtr, @dstPtr, 72);

Use "InlineP" because it is a procedure. $A8D0 is the trap number for "UnPackBits." The "@" operator is for the **var** parameters. The parameter "72" defines the number of bytes done at a time.

"SrcPtr" is incremented by "UnPackBits." When "srcPtr" reads past the first 512 bytes of "Buffer," Buffer[2] is copied into Buffer[1], and new data (if there is any), is read into Buffer[2]. "SrcPtr" is adjusted, and the loop continues until all the rows of the picture are decompressed.

When the loop is complete, the decompressed picture data is contained in "PicBits." Then, a bit-map "B" is set up to represent an 8-inch by 10-inch page. The GetPort call returns a pointer, in the variable "G," to the GrafPort of the Drawing Window. Then CopyBits blasts the image from "PicBits" into the Drawing Window.

This program only displays the upper left corner of the picture but you can easily enhance it.

Obviously, the Macintosh screen is not 8-inches by 10-inches; hence, this program displays only the upper left corner of the picture. The diligent reader may overcome this condition using the clues below:

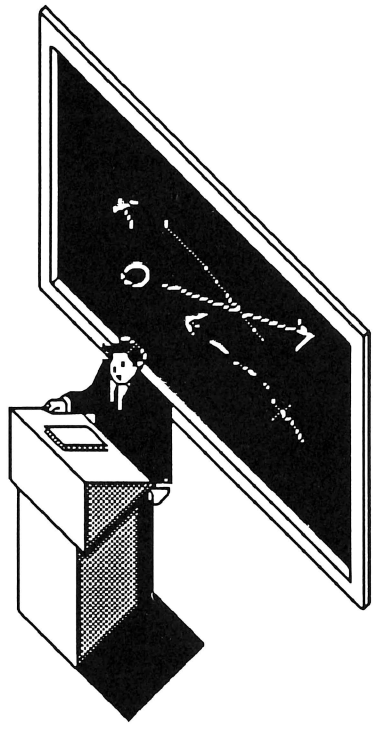
1. Enhance "ReadPicture" to allow the user to specify an origin for the picture, so that the user may view any desired portion of the page, not merely the upper lefd corner.

2. Modify "ReadPicture" so that the picture is scaled to fit the dimensions of the Drawing Window. Thus, the user may examine the entire picture (similar to the Show Page option in MacPaint). Hint: CopyBits does scaling.

Here is a listing of the PASCAL program.

```
program DisplayPicture;
 uses
  QuickDraw2;
 const
  UnPackBits = $A8D0;
 type
  Block = array[1..256] of Integer;
  PicBuff = array[1..25920] of Integer;
  PicBuffPtr = ^PicBuff;
 var
  F : file of Block;
  I : Integer;
  Buffer : array[1..2] of Block;
  PicBits : PicBuffPtr;
  SrcPtr, DstPtr : QDPtr;
  G : GrafPtr;
  B : BitMap;
  DrawRect : Rect;
begin
 HideAll;
```

```
SetRect(DrawRect, 3, 40, 508, 339);
ShowDrawing;
Reset(F, OldFileName('Picture File*'));
Get(F);
for I := 1 to 2 do
 Read(F, Buffer[I]);
SrcPtr := @Buffer;
New(PicBits);
DstPtr := PicBits;
for I := 1 to 720 do
 begin
  InLineP(UnPackBits, @SrcPtr, @DstPtr, 72);
  if Ord(SrcPtr) > Ord(@Buffer) + 512 then
   begin
   Buffer[1] := Buffer[2];
   if not Eof(F) then
   Read(F, Buffer[2]);
   SrcPtr := Pointer(Ord(SrcPtr) - 512)
   end
 end;
B.BaseAddr := PicBits;
B.RowBytes := 72;
SetRect(B.Bounds, 0, 0, 576, 720);
GetPort(G);
CopyBits(B, G^.PortBits, B.Bounds, B.Bounds, SrcCopy, nil)
end.
```



Macintosh Pascal 2.0 Update

This document contains information on how Version 2.0 of Macintosh Pascal differs from Version 1.0.

Version 2.0 includes changes in these areas:

You will find a new Pascal Applications Shell included.

— New user interface features.
— Larger program size.
— The addition of a Pascal Applications Shell that allows you to run your programs without using the editing/debugging interface.
— Desktop configuration saving.
— The program context is preserved after an error.
— Changes to the SANE library.
— New language features.
—Advanced programming features.

NEW USER INTERFACE FEATURES

There are four major changes to the Macintosh Pascal user interface:

Tabs allowed in comments.

1. You can use tabs in your comments.

Tabs are now available before and inside comments. This allows you to easily align comments to the right of program lines. You cannot, however, use tabs in other parts of your programs.

Tabs are initially set at one tab stop every 16 pixels. (This is equivalent to approximately the width of five characters). You can change the tab stops by using the new Windows menu option, Preferences, which is described below.

Choose any font for display in the program windows.

2. The Type Size option in the Windows menu has been replaced by the Font Control option.

The Font Control option allows you to choose any available font for display in the program windows (Program, Instant and Observe) and in the text window.

3. The Windows menu now includes a "Preferences" option.

The Preferences option allows you to set the width of the indent used in the program window, the width of tab stops, the number of characters to be displayed in the text window. You can also use Preferences to choose "output options"—where you want the output from your program to be "echoed." You can choose to output to the printer, and you can specify the name of a file.

If you choose to output to the printer, every READ, READLN, WRITE, or WRITELN will be sent to the Printer port, as chosen by the desk accessory "Choose Printer" (in addition to the destination specified by the statement). If you specify the name of a file as an output option, anything that your program displays in the text window

will also be written to the specified file.

These options may be used simultaneously. Both will remain selected until you change them or quit. (In particular, they remain active even when you close one program and then open another.)

4. The File menu's Save As option now includes two new choices: Save As Application and Save As Object.

You can save as an "application" or as an "object" file.

When you choose the Save As Application option you create a program that can be run directly, without going through the standard Macintosh Pascal editing/debugging interface. You cannot edit an application—when you use this option you create a second copy of your program with a different name than the source file. The program window title will retain the name of the original file.

The Save As Object option saves a program in Macintosh Pascal's internal format. This means a faster launch time for large programs. In addition, stop signs are preserved in programs saved as objects. However, programs saved as objects are larger than programs saved as text.

LARGER PROGRAM SIZE

Larger programs.

The maximum program size on a Macintosh 128K is now approximately 750 lines; on a Macintosh 512K, it's approximately 2,000 lines.

APPLICATIONS SHELL

You can create "stand alone" Pascal applications.

The Applications Shell is a noncopy-protected runtime version of the Macintosh Pascal system. It includes only the ability to start up and execute an existing Macintosh Pascal program that has been saved as an application. The Applications Shell is in a file called "PShell" on this disk. You can create stand-alone Macintosh Pascal program disks by copying the System Folder, the Applications Shell and an application onto a blank disk.

DESKTOP SAVING

Desktop characteristics now retained.

Each Macintosh Pascal program that you save will now retain the desktop characteristics that you've selected, including the size, placement and visibility of the program, text, and drawing windows; the tab width, indent width, and text window buffer size; and the Font Control options.

If a font used in a given file is not available on the disk when the program is opened, the default font, Geneva 12, is used for the program windows, and Monaco 12 is used for the text window.

USING MACWRITE WITH MACINTOSH PASCAL

As always, you can use MacWrite to create and edit Macintosh Pascal program and data files. The one restriction is that you must save these files as Text Only.

PROGRAM CONTEXT PRESERVED AFTER ERROR

Version 1.0 of Macintosh Pascal did not allow you to examine program variables after a runtime error (for example, division by zero). Version 2.0 allows you to examine variables in the scope pointed to by the Finger using the instant or observe window. You can use the Enter key to force the contents of the observe window to be evaluated. Attempting to continue program execution by "Step" or "Go" will reset your program.

CHANGES TO THE SANE LIBRARY

Several new procedures, types, and constants have been added to the SANE library, one type and two associated procedures have been removed, and one type has been redefined. Also, the default error-handling conditions within the library have been changed.

ERROR HANDLING

In Version 1.0 of Macintosh Pascal, when the USES SANE statement appeared in a program, errors such as Overflow and Divide-by-Zero did not cause an error to be generated. Instead of an error, an appropriate NaN (Not-a-Number) code (which may appear as a negtive value) was generated as a result of the calculation. In Version 2.0, this has been changed so that whenever an Overflow, Divide-by-Zero, or Invalid Operation occurs, an error is generated. It is possible to change the SANE environment to disable error halts by using the Environment and Exception procedures or by using the ProcEntry procedure. The ProcEntry procedure returns the current environment and then clears all Halt and Exception flags. See the Macintosh Pascal Technical Appendix for more information.

CHANGES AND ADDITIONS TO SANE TYPES

The type definition for EnvironRec and the two associated procedures SetEnvironRec and GetEnvironRec have been deleted.

The type definition for Exception has been changed to:

```
Exception = integer;
```

These types have been added to the library:

```
DecStr   = string;
CStrPtr  = ^char;
```

The Sig field of the Decimal record type has been changed to:

```
Sig : String[SigDigLen];
```

—Changes to SANE Constants

These constants have been added to the library:

```
DecStrLen = 255;
```

```
SigDigLen = 20;

{Exceptions}

Invalid     = 1;
Underflow   = 2;
Overflow    = 4;
DivByZero   = 8;
Inexact     = 16;
```

CHANGES TO PROCEDURES AND FUNCTIONS

The Random function has been renamed RandomX to avoid conflict with the QuickDraw Random function.

In the parameter lists for Num2Str and Str2Num, the type of the S parameter has been changed from String to DecStr.

NEW PROCEDURES AND FUNCTIONS

The 2.0 version of the SANE library includes several new procedures and functions.

The Num2Extended Function

```
function Num2Extended(X : Extended) : Extended;
```

The Num2Extended function takes a variable of any of the real types and converts it to an extended value.

String Conversion Procedures

The two procedures below are scanners for use either with fixed-length strings or strings that are received character-by-character. The S parameter is the string to be scanned, the result being returned in D. Index on input is the starting index into the string, and on output is one greater than the index of the last character in the numeric substring just parsed. The longest possible numeric substring is parsed; if no numeric substring is recognized, Index remains unchanged. ValidPrefix returns true if the entire input string, beginning at Index, is a valid numeric string or a valid prefix of a numeric string. The scanner also recognizes the various NaN codes. CStr2Dec is functionally identical to Str2Dec except that it expects a "C" style string as input. That is, a string with no length byte, that is terminated by a NUL.

```
procedure Str2Dec( S : DecStr;  var Index : integer;  var D : Decimal;
                   var ValidPrefix : Boolean);

procedure CStr2Dec( S : CStrPtr; var Index : integer;  var D : Decimal;
                   var ValidPrefix : Boolean );
```

The Dec2Str Procedure

```
procedure Dec2Str( F : DecForm;  D : Decimal; var S : DecStr );
```

The Dec2Str procedure converts a number in decimal format to a character string, which is returned in S.

The NaN Function

```
function Nan( I : Integer ) : Extended;
```

The Nan function takes an integer representing a NaN code and returns the bit pattern signifying that NaN in the extended format.

LANGUAGE IMPLEMENTATION FEATURES

Macintosh Pascal Version 2.0 includes a number of new language features. The major new features include:

- Relaxed order of declarations
- Procedural parameters
- Two new constants (PI and INF)
- File buffers for disk file I/O, the addition of two new device names, and changes to PRINTER:

RELAXED ORDER OF DECLARATIONS

Version 2.0 allows you to declare labels, constants, types, variables, procedures, and functions in any order. You can have as many of these declaration parts as you want, in any order. There is only one restriction: Forward pointer references must be resolved in the same type declaration part.You must still declare any label, constant, type, variable, procedure, or function before it is referenced within your program.

PROCEDURAL PARAMETERS

You can now pass procedures and functions as parameters, as discussed in sections 7.3.3 and 7.3.2 of the *Macintosh Pascal Reference Manual.*

NEW CONSTANTS

Two new extended-type constants have been added to Macintosh Pascal: INF and PI. INF is an extended representation of infinity that is used by the Standard Apple Numeric Environment. PI is an extended-type representation of PI with a precision of 19 decimal digits. These are global constants and are always available.

CHANGES TO FILES, NEW DEVICE NAMES, AND CHANGES TO PRINTER:

Each Macintosh Pascal file now contains an access path buffer, which is a 522-byte buffer that is used by the toolbox to store a sector from the disk. This means that disk I/O is considerably faster when more

than one file is open. However, more memory is used.

If you are concerned about memory use by your program, use the predefined files INPUT and OUTPUT, which also contain file buffers. But remember that if you redeclare INPUT and OUTPUT in the main program, two additional buffers will be created and the 1K of storage already allocated will become inaccessible.

Two new device names (TEXTWINDOW: and KEYBOARD:) have been added to Macintosh Pascal. KEYBOARD: is the default file for use with the predefined file INPUT, and TEXTWINDOW: is the default for the predefined file OUTPUT. These file names may not be used with any file variables other than INPUT (for KEYBOARD:) and OUTPUT (for TEXTWINDOW:). You can use these device names to return INPUT and OUTPUT to their default settings if they have been closed and used with other files, as in these examples:

```
RESET(INPUT, 'KEYBOARD:'):              {If INPUT has been
closed}

REWRITE(OUTPUT, 'TEXTWINDOW:');  {If OUTPUT has
been closed}
```

Note that these device names are strings and must be delimited by single quotation marks.

The device PRINTER:, which was included in Version 1.0, has been changed slightly for use with AppleTalk. When a program writes to the printer, the printer port chosen with the Choose Printer desk accessory will be used. For example, if you have chosen the Modem port, PRINTER: output will go to the "A" or Modem port, and the MODEM: device output will go to the "B" or printer port. If the "B" or Printer port is chosen for output by the PRINTER: device and the port is configured for AppleTalk, an error occurs.

CONTROLLING ASYNCHRONOUS SOUNDS

You can halt any sound being played by clicking on the Pause menu. Any pending asynchronous sounds will be flushed. If an asynchronous sound is started and the program is exited by reaching the end of the program, encountering an error, or pausing, the sound will be halted. You can force an asynchronous sound to continue even if one of these conditions arises by making this the last statement in your program:

```
WHILE NOT SoundDone DO ;
```

MISCELLANEOUS FEATURES AND ERRATA

• In Release 1.0, LongInt overflow was occasionally detected. In Release 2.0, LongInt overflow is never detected (to allow pointer arithmetic to safely wrap around).

• Large Block Comments (in excess of about 20 lines without an intervening statement) may cause the system to run out of memory and crash.

• A '*' put at the end of the prompt string for the OldFileName function will display all the files on the disk, instead of just text or data files.

• The "Enter" key on the keyboard generates an End Of File whereas the "Enter" key in the optional keypad generates a Return.

• Direct or indirect invocations of the "New" procedure from the Observe or Instant Windows will often generate an error.

• Under Release 1.0, Pointer-type checking was not done. Pointer-type checking is always done now.

• The "pointer" function now accepts either an integer or pointer-type argument and coerces the argument into an anonymous type that's compatible with all other pointer types.

• Attempting to assign variables of a record or array type containing a file variable will cause Macintosh Pascal to crash if the files are open.

Advanced Pascal Programming Features

Version 2.0 of Macintosh Pascal includes several new advanced programming features:

• Procedure pointers
• New predefined procedures for manipulating relocatable objects in memory.
• Support for resources in program files.
• Several miscellaneous changes and additions.

These features are included for programmers who use the InLines or Generic procedures to access the routines in the Macintosh ROM. See the InLines and Generic files on the Macintosh Pascal disk and *Inside Macintosh* for more information.

PROCEDURE POINTERS

Procedure pointers are pointers to Macintosh Pascal functions or procedures that are passed to various routines in the Macintosh ROM to allow you to specify nondefault actions. For example, the low-level File Manager routines (described in the File Manager chapter in *Inside Macintosh*) each include a parameter called "ioCompletion."

"ioCompletion" points to a procedure to be executed when the File Manager routine has completed. Any routine that executes at the completion of an asynchronous routine is called a completion routine.

Procedure pointers are also used in other ways. For example, many of the routines in QuickDraw in turn call low-level drawing routines—routines that draw the basic shapes. They do this by using a procedure pointer. You can change the procedure pointers that are passed to QuickDraw routines so that they point to your own custom routines. In that case, the procedure that's pointed to is called during the course of the execution of the calling routine—not when the routine has completed. Any routine that uses a procedure pointer to point to a customized procedure during its execution can be referred to as an "action routine."

It is also possible to use procedure pointers to point to routines that are not in the program. For example, you could pass a pointer to an array that contains an assembly-language routine. However, this is a risky practice—use it cautiously.

To use procedure pointers in a Macintosh Pascal program you must include the statement:

```
USES ProcPtrs;
```

after your program heading.

You can use up to 60 procedure pointers in one program. Using the ProcPtrs library takes up about 1.6K of memory at runtime.

Procedure pointers can point to two type of routines: completion routines and action routines.

Completion Routines

Completion routines are procedures with no parameters that are executed by certain asynchronous ROM routines at the end of the specific routine. They are used for a variety of reasons, including to signal termination of the routine or to queue up data in data buffers. They are passed to the selected ROM routine by means of a call to the Generic procedure. (See the file named "Generic" on the Macintosh Pascal disk for more information.)

Completion routines are typically executed asynchronously—that is, the code that's being executed is interrupted and control passes to the completion routine. When the completion routine terminates, execution of the interrupted code is resumed. In Macintosh Pascal, all pending completion routines are executed at the end of the currently executing Macintosh Pascal statement.

You use a completion routine with one of the following ROM routines by passing a procedure pointer as the ioCompletion field in the parameter block of a Generic call:

- low-level File Manager routines
- low-level Device Manager routines

You can also pass a procedure pointer as the third parameter of a StartSound call. (StartSound is a Sound Driver routine. See *Inside Macintosh* for more information on these routines.)

If you pass a procedure pointer to a StartSound call, the completion procedure is executed after the sound has been played. If you pass a procedure pointer to a low-level File Manager or Device Manager routine, one of the following trap words must be used in the call. No other trap words are recognized as asynchronous traps. In addition, the ASYNC bit must be set in the trap word. The ASYNC bit is bit number 10 of the trap word. Thus, an asynchronous call to the ROM Read routine would use "A402" as the trap word, whereas "A002" would be used in a synchronous call.

Asynchronous Traps

A000	Open	A010	Allocate
A001	Close	A011	GetEOF
A002	Read	A012	SetEOF
A003	Write	A013	FlushVol
A004	Control	A014	GetVol
A005	Status	A015	SetVol
A006	KillIO	A017	Eject
A007	GetVolInfo	A018	GetFPos
A008	Create	A035	Offline
A009	Delete	A041	SetFilLock
A00A	OpenRF	A042	RstFilLock
A00B	Rename	A043	SetFilType
A00C	GetFileInfo	A044	SetFPos
A00D	SetFileInfo	A045	FlushFile

Certain restrictions apply to the use of completion routines. A completion routine must be declared at the top level of the program in which it will be used. No GOTOs are allowed out of a completion routine. Completion routines cannot be interrupted, which means that if a completion routine itself starts other asynchronous routines, any completion routines that result will not be executed until the current one is finished.

You can use the Step option to trace execution of a completion routine.

However, it's important to understand the sequence of events that takes place when a completion routine is executed. When a program is being executed, pending completion routines are queued up until the end of the currently executing statement. However, if the person using the program causes a return to the user interface by inserting a Stop Sign or using the Pause option, all asynchronous I/O ends and the completion-routine queue is emptied. So in order to use asynchronous I/O and completion routines, the program must be run without halting. You cannot directly step into a completion routine —you must insert a Stop Sign at the beginning of the routine. This will cause any other pending completion routines to be flushed, but you can then step through the one you've selected.

Any procedure pointer that is passed to the StartSound routine is ignored if the ProcPtrs library is not used. Also, a StartSound procedure pointer that does not point at a procedure is executed immediately following the sound (by a JSR instruction), as opposed to the end of the current statement.

Action Routines

The general term "action routine" refers to a routine that is used by various Macintosh ROM routines to perform tasks during the execution of the calling routine, for example:

- A routine that's used by TrackControl to perform whatever action is appropriate for a given control.

- A "filter function" that's used by one of the routines in the Standard File Package.

- A drawing routine that's used to replace one of the QuickDraw low-level drawing procedures.

See the following sections of *Inside Macintosh* for more information:

TrackControl (Control Manager chapter)
Standard File Package chapter
Low-level QuickDraw routines (QuickDraw chapter)

Action routines are similar to completion routines, except that they are performed during the execution of a ROM routine, rather than at the end of a routine. Both completion routines and action routines are pointed to by using a pointer to a procedure as an argument to a ROM routine.

You must use the parameters and the function result types that are specified for each of these routines in *Inside Macintosh.* Parameters to action routines are supplied by the routine in ROM.

WARNING: No type checking of procedure or function parameters is possible when using the InLines facility. You are responsible for supplying the correct parameters for action routines. An action routine that is a function may only return Lisa Pascal function result types, and not the greater range possible in Macintosh Pascal.

As with completion routines, GOTOs are not allowed out of an action routine. An action routine will be interrupted by pending completion routines. Unlike completion routines, you may step into action routines in many circumstances. Also, once a procedure pointer has been used as a completion procedure, it may not be used as an action routine. Procedure pointers that are used in StartSound and Generic calls are marked as completion procedures.

Action routines used with package traps (notably SFGetFile) cause special problems due to Macintosh Pascal's memory usage. Additional restrictions and cautions apply. First of all, no dynamic memory allocation using the New procedure is possible during the execution of an action routine. Also, the user should never cause memory management to occur, such as looking at the About Macintosh Pascal window, during the execution of an action routine. Action routines should always be allowed to complete normally, or unrecoverable pointer blocks may be left in the system heap.

MACINTOSH PASCAL MEMORY USE

A brief introduction to memory management in the Macintosh is provided in the Macintosh Memory Management: An Introduction chapter of *Inside Macintosh.* Macintosh Pascal uses the Macintosh RAM in a slightly different way.

Version of Macintosh Pascal includes new predefined procedures for manipulating relocatable objects. (A relocatable object is an object that can be moved within memory and is referred to indirectly by means of a handle.) Anyone using these procedures needs to have a basic understanding of how Macintosh Pascal uses memory.

Macintosh Pascal uses two main runtime data structures: the machine stack, which grows downward from high memory, and the general stack, which is located at the bottom of the application heap just above the master pointer area, and grows upward. The second stack is actually a pointer object whose base is fixed throughout a Macintosh Pascal session. When the interpreter or the user interface is running, its code segments are moved to the top of the application heap and locked. Thus, programmers who cause objects to be allocated in the heap must be very careful not to cause the objects to be locked down just above the general stack. This will almost always cause the interpreter to run out of memory and exit to the Finder. Similarly, objects should not be allowed to be locked down just below the code segments that are locked high. In an effort to help programmers around these constraints, several new predefined procedures have been added to Macintosh Pascal.

NEW PREDEFINED PROCEDURES

The function MoveHHi, and the two procedures HLock and HUnlock have been added for use with relocatable objects. MoveHHi takes a pointer-type argument and returns an integer as result. The pointer-type argument is assumed to be a handle of some kind. The handled object is moved to the top of the application heap. The result returned is 0 if successful, and –1 if there is not enough room to move it.

HLock and HUnlock lock and unlock relocatable objects. They each take the relocatable object's handle as a parameter.

You should use these procedures cautiously. To prevent heap fragmentation, you should always call MoveHHi before locking a relocatable object.

The other new predefined procedure is FlushEvents. This procedure works as specified in *Inside Macintosh* (in the Operating System Event Manager chapter) with the added side effect that the Macintosh Pascal event handling is disabled. This allows you to create and use menu bars, without the mouse events being intercepted by Macintosh Pascal. Once this has been done, the Pause menu will no longer function. In a similar way, using EventAvail and GetNextEvent also disable Macintosh Pascal event handling, thus disabling Pause.

RESOURCES

Macintosh Pascal now supports the use of resources in a program file. When a program file is run, the resource fork of the file is also opened. Thus, a program can simply use Resource Manager routines such as GetResource to access resources that have been placed in the resource fork of the program file. This is generally done with one of the available resource editors. When the Save As command is used, any resources in the program file are copied to the new file.

MISCELLANEOUS INFORMATION FOR ADVANCED PROGRAMMING

• Byte-sized record components in Lisa Pascal are not directly accessible in Macintosh Pascal.

• In Version 1.0, menu bars put up by user programs would cause the system to crash if a return to the user interface occurred. Returning to the user interface now restores the Macintosh Pascal menu bar and preserves the user's menu bar. Thus, it is now possible to step through code that puts up a menu bar. Menu numbers 1 through 9 are used by Macintosh Pascal and so should never be used within a Macintosh Pascal program.

• Programs that create windows should allocate memory for the WindowRecord in a program variable, *never* by default in the heap (this will cause Macintosh Pascal to run out of memory).

• User-created windows will automatically be disposed of whenever a program is Reset explicitly or implicity (for example, by editing the program, or quitting).

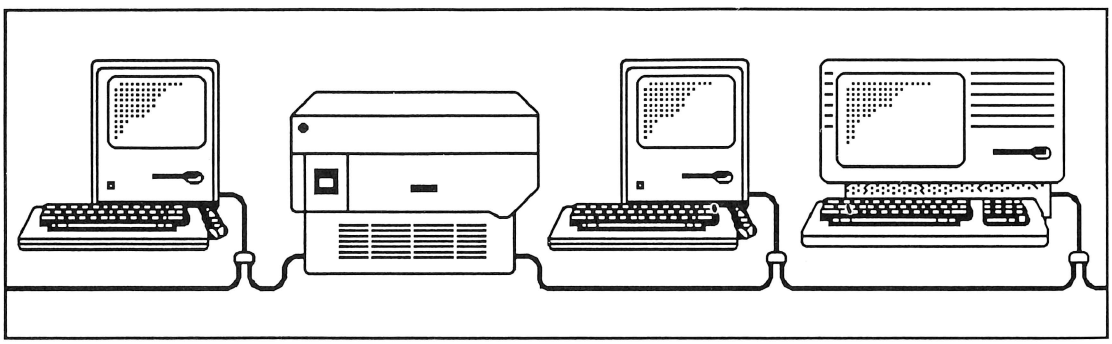
• The trap word accepted by InLine calls is now constrained to be any A8xx, A9xx, ACxx, or ADxx trap. See the associated file "InLines" for more information. In addition, the RTS instruction can be used as a trap word. The A0 register points at the trap word when InLine is executed and thus can be used to calculate a return address from a subroutine. For example, given that we have an array called MyCode that contains the following 68000 machine code:

```
addq.w    #$02,A0    ; Point at return address.
...                  ; Some 68000 code.
jmp       (A0)       ; Return to Pascal.
```

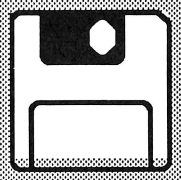
You can invoke this subroutine with the following Pascal code:

```
InLineP($4E75, @MyCode);     { 4E75 = opcode for RTS }
```

• The trap word accepted by the Generic procedure is constrained to be any A0xx trap word or any other word which is not an A8xx, A9xx, ACxx, or ADxx Trap. The second parameter may be any record or array that is exactly 52 bytes long. ❦



A great technical development network !



Macintosh Products

Hardware and Software

The "MACINTOSH PRODUCTS" portion of ***Wheels for the Mind*** provides information about third-party products for the Macintosh. Where appropriate, information is organized by application area. Any review of products is unashamedly subjective and usually reflects the opinions of one user; please use the reviews only as a reference point. In order to make it as easy as possible for you to keep up with what is available, **new listings appear in boldface**.

If the phrase, "NO FEEDBACK YET" appears next to a selection, it simply means that the person preparing the review has not yet tried the product, or has not received feedback from other users. As we get reactions to various products, this, of course, will change. If there are articles or reviews available for a particular product, these citations will appear along with the product description.

Some products that you would expect to see in this listing are not yet here. This, too, will change in the near future. As time passes, we hope to have an exhaustive list of Macintosh products. As we progress through the year, **this list should become annotated with the experiences and comments of all you readers out there.**

Thus, in time, this section could become a very valuable resource for those selecting or recommending available Macintosh products. In fact, it may be the only such reference available. However, it will only work if you help. **Please send in your observations about the Macintosh products you have used.**

This section consists of two parts:

Part 1 contains some fairly complete descriptions of a few new products that might be of interest to our community.

Part 2 provides a brief listing of a variety of other products along with article references when available.

Part 1: PRODUCT FEATURES

PROGRAMMING IN BASIC

True BASIC, Inc. is a software developer and publisher located in Hanover, New Hampshire. Founded in 1983, its principals include John Kemeny and Tom Kurtz, professors of math and computer science at Dartmouth College, and the original coinventors of BASIC. The company's first product, the True BASIC Language System, is a structured BASIC programming environment for microcomputers. TBI's other products include applications for math and social science at the university level.

True BASIC Language System. True BASIC combines the best features of BASIC with the advantages of a portable, structured programming language. The language moves away from line numbers by supporting control structures such as SELECT CASE, DO/LOOP, and multiline IF/THEN/ELSEIF. Named subroutines accept parameters passed by reference or by value. These subroutines can be separately compiled and saved in external libraries. Variables can be global or local, with full support for recursion.

The language also includes a complete matrix package for inversions, determinant, matrix algebra, and matrix I/O. Graphics syntax, which is similar to GKS graphics, includes built-in 2-D transforms for scaling, rotating, shifting, and shearing images.

The Language System includes an Editor that follows Macintosh editing conventions, and a Compiler that compiles source to an intermediate code before execution.

The Macintosh version of True BASIC also includes access to QuickDraw and other ROM routines through external library calls. It will run on a Macintosh 128K, but a Macintosh 512K is strongly recommended for any serious programming.

Site Licensing

The True BASIC Language System is also available on a site-license basis for both educational and corporate users. In fact, the Macintosh version of True BASIC has been used by Dartmouth on a site basis since mid-1985. Educational users should contact Toni Formicella at Addison-Wesley, (617) 944-3700; corporate users should contact Don Shaw at True BASIC, Inc., (603) 643-3882.

Kemeny/Kurtz Math Series

True BASIC is a superb language for developing educational software. John Kemeny and Tom Kurtz have used it to develop a series of educational software packages. No more drill-and-practice software—explore your own topics at your own pace with these graphics-oriented tools! The following titles are currently being developed for the Macintosh:

CALCULUS—Topics include multiple derivatives, limits, tangents, maxima and minima, area under a curve, L'Hopital's rule, parametric equations, Taylor series, and differential equations.

PRECALCULUS—Plotting of functions, finding roots, solving triangles, conic sections, polar coordinates, inverse functions, the equation of a line, and composition of functions.

DISCRETE MATH—Truth tables, Venn diagrams, elementary combinatorics, graph theory, recursive definition of functions, binary trees, and systems of equations.

PROBABILITY—Simulations of coin toss, dice toss, and random walks, Bayes probabilities, random variable distributions, gambler's ruin, Markov chains, and Monte Carlo methods.

ALGEBRA II—Systems of equations, quadratic equations, systems of inequalities, prime factoring, repeating decimals, complex number arithmetic, and graphic illustration of root-finding.

STATISTICS—An interactive analysis system, stressing simulation of various distributions, graphic output, and the ability to create, edit, and run statistical programs using a built-in screen editor.

True BASIC Primer

Written by William S. Davis, the primer is the first textbook written especially about True BASIC. It is designed for beginners with little or no experience in programming, and may be used as a classroom text or a self-study guide.

Back to BASIC

John Kemeny and Tom Kurtz examine the "history, corruption, and future" of the programming language that they invented more than 20 years ago. They trace the evolution from early BASIC to True BASIC, and use many sample programs to state their case for structured ANS BASIC.

Computing for a Course in Finite Mathematics

Kemeny, Kurtz and J. Laurie Snell are coauthors of this text, which emphasizes the use of computing as the primary approach for teaching a first course in finite mathematics. The programs used in the text are written in True BASIC and are also available on disk for classroom use.

Customer Support

We've worked hard to make True BASIC easy to use. There's a lot of useful information in both manuals, so please read them as your first source of help. If you're still having problems, we do provide support for registered users. True BASIC's Customer Support line, (603) 643-3884, is open from 9A.M. to 6P.M., EST. If your questions get really difficult, we may suggest consulting services or other sources of information.

Runtime Package

Whether you're a professional developer or just want the best possible performance from your programs, the Runtime Package is for you. The Runtime Package converts your programs into stand-alone .EXE files that run on any IBM PC. It includes a license to distribute your applications without paying additional royalties. The Runtime Package also includes the Developer's Toolkit, a handy library of IBM-specific routines.

PC BASIC Converter

Switching to True BASIC doesn't mean you have to start all over again. The PC BASIC Converter translates programs written in BASICA so that you can take advantage of True BASIC's advanced features. We can't create structured programming out of spaghetti code, but we can salvage a lot of your hard work.

Libraries

True BASIC makes it easy to create libraries of routines that can be shared by all your applications. We encourage you to build your own. We've also produced some libraries that might save you some time. True BASIC libraries come with demo programs and source code that you can examine and modify. Current titles include:

DEVELOPER'S TOOLKIT—IBM-specific routines for creating, reading and removing subdirectories, switching between displays, causing DOS interrupts, and more.

COMMUNICATIONS SUPPORT—Send and receive data via the serial port at rates up to 19200 baud. This library provides fully buffered support for using both COM ports simultaneously.

FORMLIB—Design elaborate screen forms for data entry. You specify which field needs to be a valid date, which ones are protected. Library subroutines handle cursor movement, error handling, and all the rest!

SORTING AND SEARCHING—Quicksorts, heapsorts, pointer sorts, multikey sorts, binary searches, everything you need to manipulate string or numeric arrays with dazzling speed! Demo programs include a cross-reference utility and a telephone directory.

BTRIEVE INTERFACE—Now you can use True BASIC with Btrieve, a popular file-management package developed and marketed by Softcraft, Inc. (You must purchase Btrieve separately.)

STELLA: Software for Leveraging Your Thinking

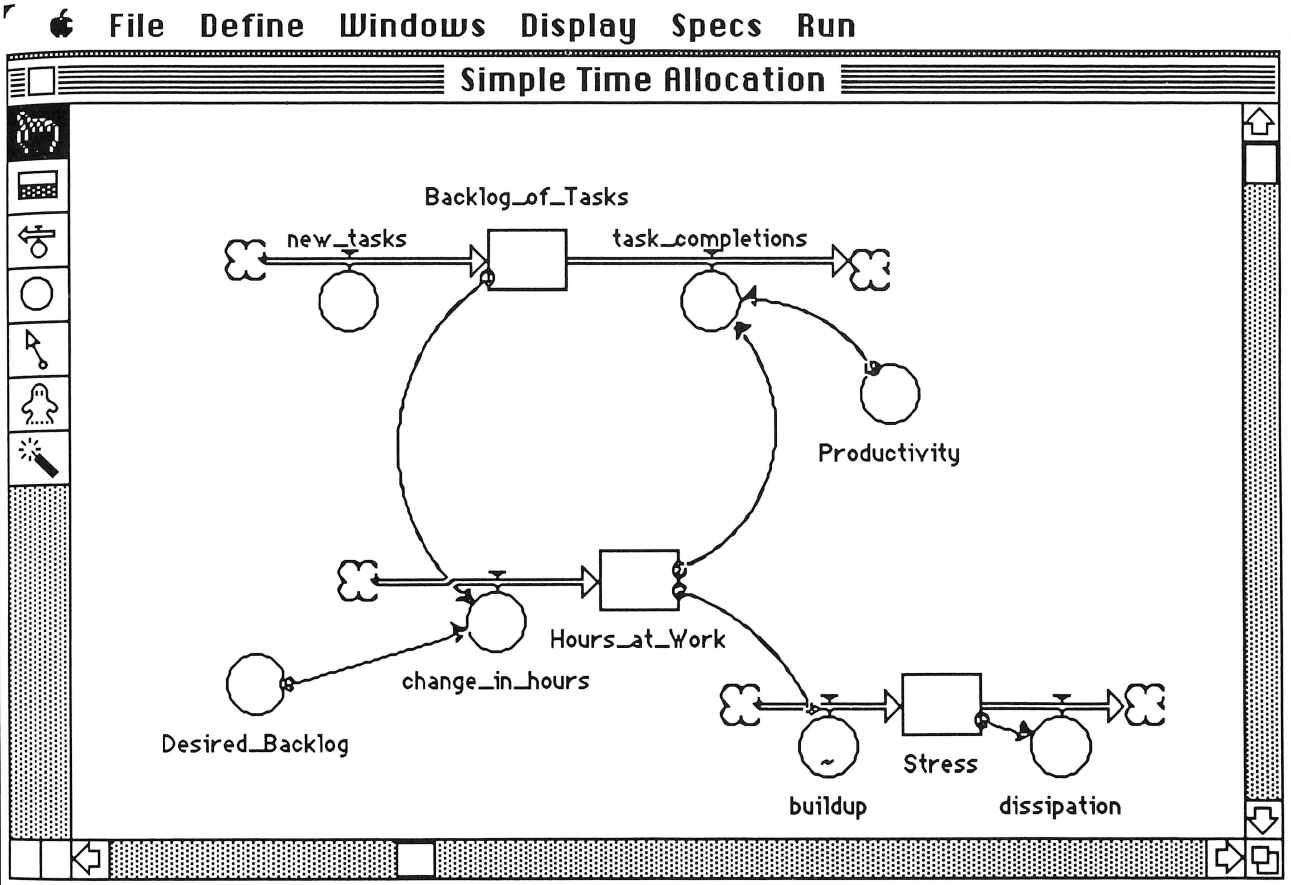
Barry Richmond
Professor, Dartmouth College
President, High Performance Systems, Inc.

A Conceptual Lego Set: STELLA is like a conceptual Lego set. Using STELLA's toolkit, you select, position, and connect various structural elements to piece together a set of relationships. As you do, STELLA automatically generates many of the equations necessary to simulate the behavior of the system that you are creating. Additional equations are easy to include, either by sketching in curves with the mouse, or by clicking-in special functions included in STELLA's "built-ins" list. Once a structural diagram is complete, you can view the system's output as an animation of the diagram, or as plots or printed numerical values.

A sample of the titles of the term projects from the fall course that I teach at Dartmouth serves as testimony to the breadth of applications that STELLA can address: chemical kinetics, high-altitude sickness, Third-World economic development, pollution of Boston Harbor, anorexia, Festinger's theory of cognitive dissonance, teenage pregnancy, the design of a servomechanism, international monetary flows, oil price dynamics, development of high-tech growth strategies, AIDS, the farm debt crisis . . . the list goes on. If you can conceptualize it, STELLA enables you to simulate it—and you need neither mathematical skill beyond high school algebra nor computer programming expertise.

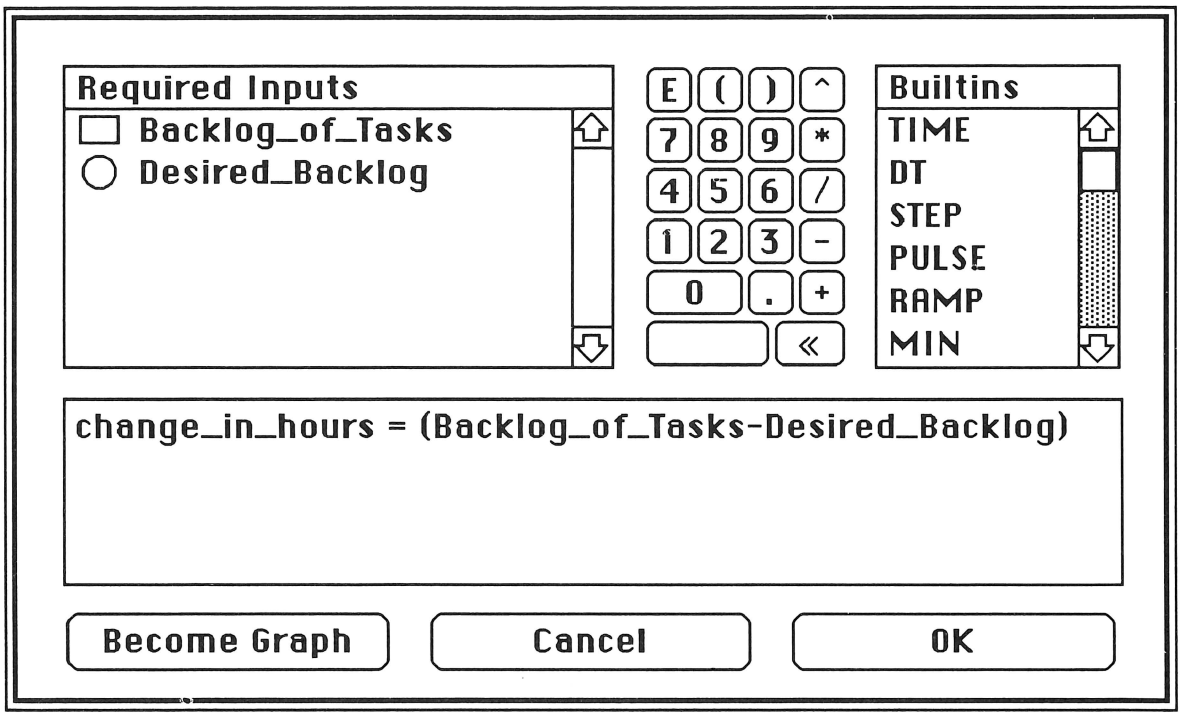
STELLA creates a laboratory environment for learner-controlled, discovery-oriented learning. Students can work with already created models, or create models of their own. Faculty can use STELLA to prepare dynamic classroom illustrations, to develop problem sets and exercises, or as a vehicle for conducting research. A simple example will help to illustrate some of STELLA's features, and how the software can be used.

A Simple Example: We've all experienced the stress that comes from having too much to do and not enough time to do it. The STELLA tableau below depicts a simple model of the phenomenon. The diagram was created by selecting "stocks," "flows," and "converters" from the toolkit running down the left margin of the diagram window. These structural elements—tool kit items 2, 3, and 4 respectively—were then "hooked up" by stretching and pinning "Input Links" (item 5 in the tool kit) between them.



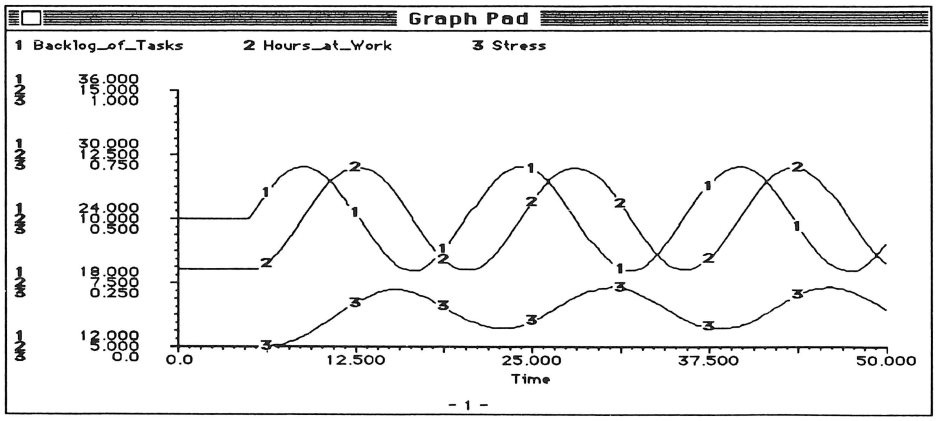
Stocks are the rectangles. They represent accumulations. Stocks can be physical accumulations, such as a backlog of tasks, or they can be metaphysical accumulations, such as stress. Stocks serve as the basis for decisions. Decisions, in turn, produce actions. Actions are "flows," depicted as conduits (or pipes) in STELLA. Flows fill and drain stocks. Converters intercede between stocks and flows. They translate information about conditions within the system (as reflected in the magnitudes of the stocks) into pressures to take action, and then convert the actions into "valve settings" that regulate flow volumes. Flow volumes then return to alter the magnitudes of the stocks—a circular chain of cause and effect.

Our simple model assumes that as the Backlog of Tasks swells relative to Desired Backlog, more hours will be allocated to work. To enter this logic, once the appropriate linkages had been added to the structural diagram, you would double-click on the element labeled "change in hours." The element then would open up to reveal a dialog box that looks like:



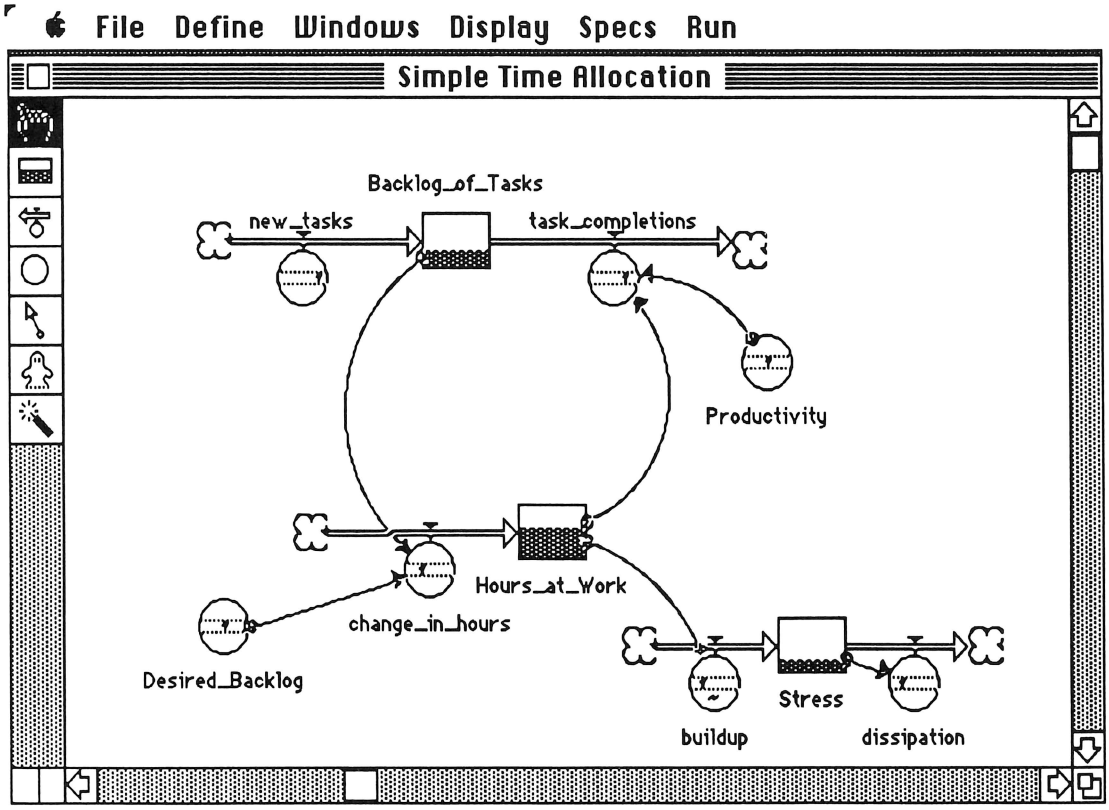
Because the structural diagram contains input links stretching from "Backlog of Tasks" and "Desired Backlog" to "change in hours," the two appear in the list of "Required Inputs" within the dialog box. Required inputs *must* be used in defining the equation. On the other hand, elements not shown as inputs on the diagram, can *not* be entered into the equation. By insisting on a one-to-one correspondence between the logic portrayed on the structural diagram and the underlying equation representation, STELLA enforces a discipline in the thought process. To enter the two required inputs into the equation, you simply click on each in turn, knitting them together with the appropriate algebraic operator clicked-in from the calculator (or entered via keyboard). Note the scrollable list of "built-ins" located on the right side of the dialog box. These functions prove useful in creating many equations.

As Hours at Work increases, the flow of task completions follows suit. And, as task completions rise, the Backlog of Tasks falls back toward normal, thereby relieving the pressure to continue increasing Hours at Work. This simple system is self-regulating, or goal seeking. It seeks to maintain the backlog of tasks at a desirable level, and adjusts time allocation in order to achieve this aim. The plot below shows how the system responds when, after initially being in balance, it is shocked by a step-increase in new tasks:

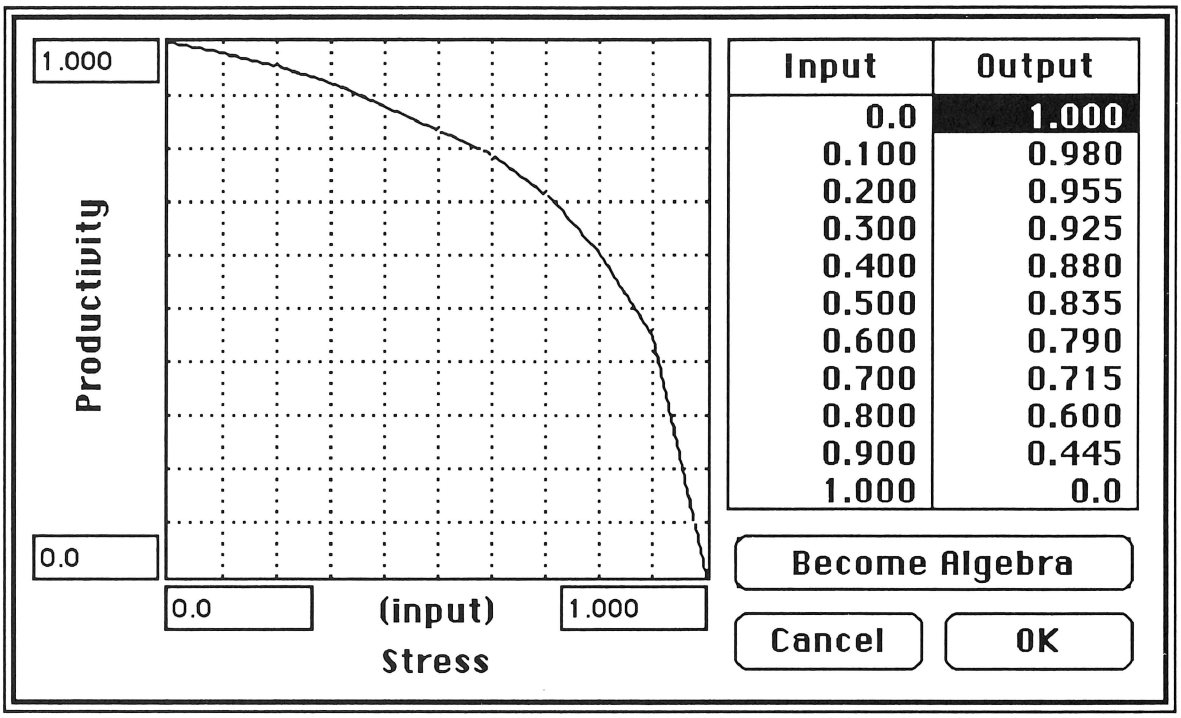


As the time series plot shows, the system exhibits a sustained oscillation—one we're all no doubt familiar with. As Backlog rises, more hours are committed to bringing the workload back down to what is considered desirable. However, by the time Backlog returns to normal, we've overcommitted ourselves in terms of hours. So, we begin to cut back. But meanwhile, due to our overcommitment, our task backlog becomes depleted below what we'd like. This precipitates a period of "slacking off," during which we recover from our previous overtime efforts. While we're recovering, the task backlog swells once more, reinitiating the cycle.

To develop a more intuitive feel for the cycle, we could use STELLA's animation feature. When the Diagram Window is showing, the dynamic behavior being generated by the model is played out through animating the elements in the diagram. Stocks fill and empty. Flow volumes are gauged by needle pointers. Converters appear as pressure gauges:

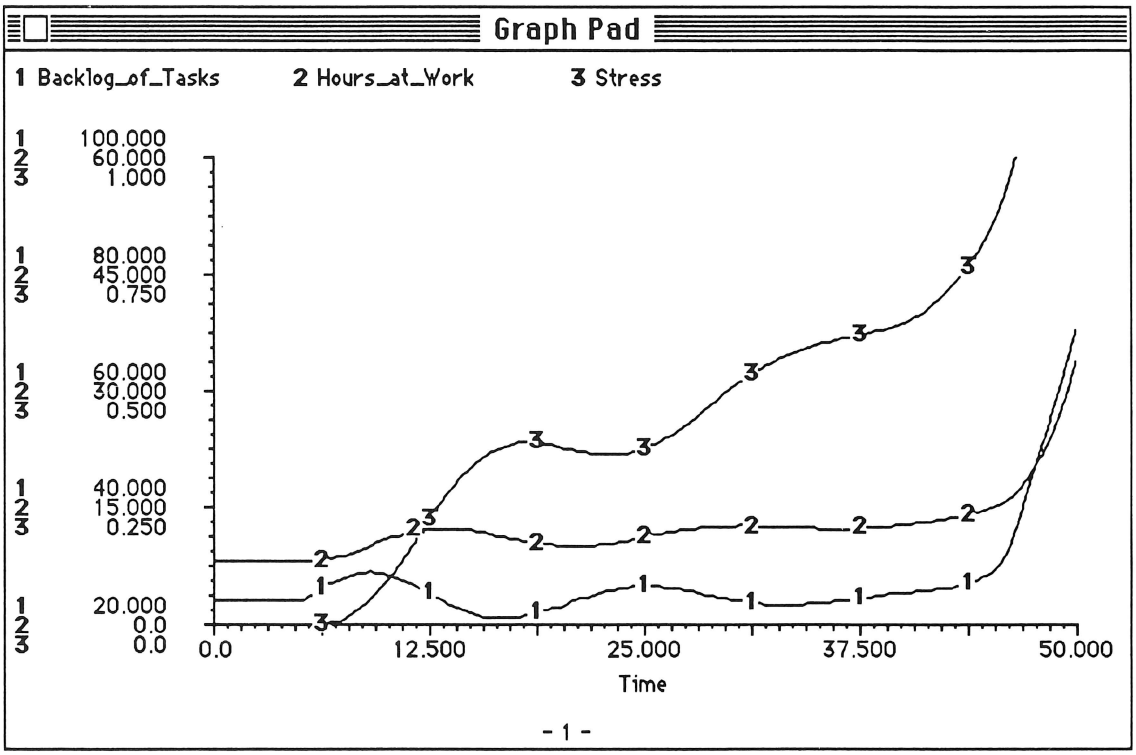


In the preliminary model, note from the diagram that there is no connection between stress, which rises with overtime hours, and productivity. But suppose that there were. Indeed, suppose that as stress increased, productivity declined—slowly at first, and then in an avalanche! To depict such an assumption, we'd use STELLA's "graphical function." Once an input link from Stress to Productivity was established, a double-click on Productivity and a click on "Become Graph" (within the dialog box) would produce a blank axis, awaiting your choice of scaling and curve shape. Here's my assumption about the relationship between stress and productivity:



As you draw the curve, the appropriate numerical coordinates appear in the columns at the right of the dialog box. If you instead choose to enter the numbers, the curve will be generated.

A plot of the system's behavior with this new, nonlinear linkage added, is shown below:



Our nice repetitive cycle of overtime/slack-off now becomes pathological! The simulation starts out the same as before. Backlog rises, calling forth more hours. But now, as additional hours are allocated, productivity *declines* (because of rising stress). The result is that even more hours must be devoted to work. And, as they are, productivity declines even more! A vicious cycle. Ultimately, the cycle results in a breakdown.

Were this simple example real, STELLA would now begin to function as a computer-aided design tool. You could use the software to examine possible structural additions and rearrangements designed to improve the behavior of the system.

Although this example is necessarily simple, and hence can illustrate only a fraction of STELLA's features and capabilities, the power of the tool should be apparent. The software brings the discipline of the scientific method, and the power of the computer for tracing out the dynamics implied by complex interdependencies, to almost anyone who can move a mouse.

STELLA-Associated Products on the Way: STELLA is a learning utility. To be useful, a utility must have applications. Several products are under development that rely on STELLA to provide a laboratory environment for learning. Two that are currently near completion are *Learning Laboratories In: Microeconomics* and *Learning Laboratories In: Physics*. These manuals are designed to be used in conjunction with the "industry standard" texts in the field. They provide students with a disciplined, laboratory environment for "discovering" the principal concepts in the field, and for experimenting with these concepts to build a deeper and richer understanding of the material. A second class of manuals called "*Classic Thinkers In: . . .*" will be available in the summer. In this series, the theories of the classic thinkers within a given discipline (the first will be economics) will be brought into a STELLA-based laboratory for "hands-on" examination. Students will be able to experiment with the theories, relaxing assumptions, adding new ones, assessing robustness, and so on. As students progress through the sequence of thinkers within a given discipline, they will begin to develop an appreciation for how the various theories relate to each other. How does Marx relate to Keynes, and how do the two compare to Marshall? For business students, a series of strategically-oriented case studies will be available in the spring.

More Information: More information about STELLA is available from High Performance Systems, 13 Dartmouth College Highway, Lyme, NH 03768; (603) 795-4122. Academic price: $102.50 (add $10 for international orders). Volume discounts available.

GRANNY SMITH CONNECTION FOR THE MACINTOSH

The Granny Smith Connection is a parallel printer adaptor for the Macintosh. It works with a wide variety of printers and is extremely easy to set up. In addition, the printer drivers that you need are included on the disk.

Some of the particulars are :

1) Universal; One Granny Smith Connection fits all Centronics style parallel devices.

2) One Granny Smith Connection can be used for A) Dot Matrix printers, B) Ink Jet Printers, c) Daisywheel / Letter Quality printers, D) Thermal printers, E) Electronic typewriters, etc., etc.

3) Works with all Macintosh graphics, text, fonts and point sizes.

4) Removable, portable, external - Hooks up in seconds, just plug it in.

5) Comes with intergrated shielded assembly and connectors; no extra cable to buy; UL & CSA.

6) No power supply needed; specially engineered to get its power from the Mac.

7) Transfers in seconds from one Mac to another and from one kind or brand of printer to another.

8) Print from either the Mac printer port or the Mac communications/modern port.

9) Easy operation; easy to understand user friendly start-up guide.

10) individually Factory tested - Full One Year Warranty.

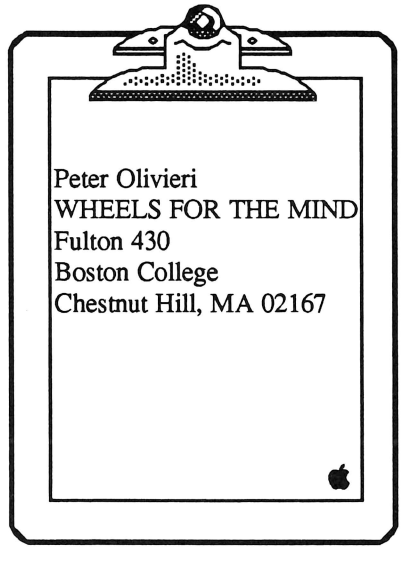
11) 100% designed, engineered, and manufactured by ZAP Logic Corp in North America.

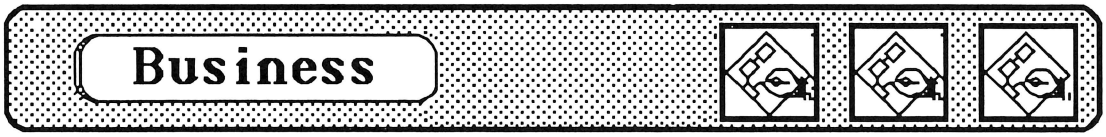
Z.A.P. Logic Corporation
5647 Yonge St., Suite 208
Toronto, Canada M2M 4E9

(416) 225-8815

ATTENTION DEVELOPERS

If you have an interesting Macintosh application,send us a copy of it (please include any specifics about how members of th educational community might best use your product). Descriptions sent on disk are especially appreciated. Make a note to send the information to :





Front Desk by Layered, Inc., maintains schedules for up to 15 people, places, or things, allowing the user to look at everyone's calendar, weekly schedule, or monthly schedule. Helps keep appointments and schedules. (617) 423-9041 (Mass.). (NO FEEDBACK YET)

Front Desk	A+ Magazine	Jun. 85	p. 107
Front Desk	MACAZINE	Jun. 85	p. 79
Front Desk	**POP. COMP.**	**Sep. 85**	**p. 107**

Spreadsheet Link by Dow Jones (used with Multiplan) and Dow Jones **Market Manager PLUS** for portfolio management. (800) 345-8500, x100. (NO FEEDBACK YET)

Back to Basics Accounting System by Peachtree Software is an uncomplicated, easy-to-learn accounting system for small businesses. Includes General Ledger, Accounts Payable, and Accounts Receivable. (800) 554-8900.

Reader feedback on Back to Basics Accounting System:

The General Ledger system is a great accounting system for small to medium-sized businesses. It allows a maximum of 254 General Ledger accounts, with three concurrent cash accounts. It generates all the customary financial statements and more. Revenue and expense accounts can be departmentalized to print up to 10 departmental incomes plus a consolidated income statement; 5 subtotals can be classified for revenue, cost of sales, and expense sections; and the balance can have 5 subtotals for assets, liability, and equity sections. The system is designed to leave a good audit trail. Financial statements can also be generated at any time within an accounting period, which is especially helpful for estimated income tax purposes. A standard "Chart of Accounts" can be adopted or modified, or one can be custom designed. Whichever is used, it is easily accessible within any application.

The Departmental Income & Expense Account Statement feature of this General Ledger system makes it easily adaptable to academia. The department head or research project manager who needs up-to-date information on account balances, encumbrances, project costs, and so forth, will greatly benefit from its use.

The newly created Accounts Receivable and Accounts Payable modules can be used independently or linked to the General Ledger. Special features include customer files, aging of accounts receivable, generation of customer statements (on computer or preprinted forms), vendor files, cash requirement reports, payment lists, computer payments (using preprinted checks), and more. Both modules generate their respective journals and reports at month's end. (Eva Roeseler, Bryan, Texas).

Back to Basics in Accounting	A+ Magazine	Apr. 85	p. 65
Back to Basics Accounting	**MACWORLD**	**Dec. 85**	**p. 75**

General Ledger is the first model in a series of business-related software to be introduced for the Macintosh. It allows the user to create a balance sheet, profit and loss statement, and a trial balance. The SmoothTalker speech synthesizer is incorporated into the application to warn of errors and mistakes. Some of the possible reports include projected income and expense accounts, comparative analyses, variance reports, detailed journals, P&L statements and much more. Price: $395. Vendor: Future Design Software, 13681 Williamette Dr., Westminster, CA 92683; (714) 891-9796. (NO FEEDBACK YET)

Accounting Series for a hard disk (the Tecmar hard disk is necessary; other drives will be added to the compatibility list shortly). The first modules to be announced include General Ledger, Accounts Receivable, Accounts Payable, Payroll, and Inventory Management. (Other modules under development are Job Costing, Estimating, and Prebilling.) Each module retails for $695. Vendor: Great Plains Software, 1701 S.W. 38th St., Fargo, ND 58103; (701) 281-0550. (NO FEEDBACK YET)

Maccountant is an accounting package designed for small businesses. With it, you can prepare income statements, accounts payable, accounts receivable, balance sheets, and general ledger accounts. Free demo disk available. Price: $195. Vendor: Digital Etc., 1749 14th St., Santa Monica, CA 90404; (213) 452-5636. (NO FEEDBACK YET)

MacInTax is an income tax program for individuals. It is mouse driven and contains the complete IRS instruction book on disk. Call to see if it contains the IRS forms that you need. Price: $75. Vendor: SoftWeave, 400 Mobil Ave. Bldg. D, Suite C, Camarillo, CA 93010; (805) 388-2626. (NO FEEDBACK YET)

MacInTax	**MACUSER**	**Jan. 86**	**p. 46**

Tax Wizard is a program that allows access to more than 20 IRS forms. Call to see if it's ready and if it contains the IRS forms that you need. Price: $64.95. Vendor: Software Resource (distributor), 817 Tenth St. #102, Santa Monica, CA 90403; (800) 851-9010 or (800) 851-9009. (NO FEEDBACK YET)

Tax Wizard	**MACUSER**	**Jan. 86**	**p. 48**

Tax Planner uses Microsoft's Multiplan to provide a very comprehensive set of tax templates. Complete tax tables are included. Call to see if it's ready and if it contains the IRS forms that you need. Price: $49.95. Vendor: Apropos Software, Inc., 64 Hillview Ave., Los Altos, CA 94022; (415) 948-7227. (NO FEEDBACK YET)

Tax-Prep uses Microsoft's Multiplan package to help the wage earner prepare up to 22 different tax schedules and forms. Call to see if it's ready and if it contains the IRS forms that you need. Price: $99.95. Vendor: EZ Ware Corporation, 17 Bryn Mawr Ave., Bala Cynwyd, PA 19004; (215) 667-4064. (NO FEEDBACK YET)

Tax-Prep	**MACUSER**	**Jan. 86**	**p. 48**

Tax Manager calculates, prepares, reviews, and prints federal income tax forms. It automatically will choose the method that results in the least amount of tax for your income situation. Call to see if it's ready and if it contains the IRS forms that you need. Price: $180. Vendor: MicroLab, 2699 Skokie Valley Road, Highland Park, IL 60035; (312) 433-7550. (NO FEEDBACK YET)

The Tax Man Cometh (several packages)	MACWORLD	Mar. 85	p. 106

MegaForm is a forms designer that functions as a spreadsheet, data base, forms generator, and report generator. Information on one of your customized forms can be automatically calculated, much like a spreadsheet. Provides a library of ready-made forms ranging from invoices to tax forms; numbers forms sequentially; works with preprinted forms, if you wish; has MacPaintlike drawing tools; and provides a selection of business graphics for your use. Vendor: Megahaus, 5703 Oberlin Drive, San Diego, CA 92112; (800) 358-8882, or in California, (619) 450-1230. (NO FEEDBACK YET)

MegaForm	MACWORLD	Jul. 85	p. 86

Dollars and $ense by Monogram helps you manage your money. It defines budgets on up to 120 accounts, writes checks, makes transactions automatically, and can prepare a full set of reports and graphics. (213) 215-0529 (Calif.). (NO FEEDBACK YET)

MacFinance is a financial analysis application. With it, you can determine the future value of an investment or calculate liquidity ratios, market ratios, activity ratios, ROI, depreciation, cost analyses, BE analysis, and bond yield analysis, as well as loan and mortgage calculations. Price: $99.95. Vendor: Superex Business Software, 151 Ludlow St., Yonkers, NY 10705; (800) 862-8800, or in New York, (914) 964-5200. (NO FEEDBACK YET)

Stock Portfolio System helps you manage a portfolio of stocks, bonds, mutual funds, options, CDs, and money-market funds, as well as other cash investments. Once data has been entered (either typed in or downloaded from Dow Jones), nine reports can be generated. These include profit and loss statements, current portfolio status, interest income and expenses, and a dividend income statement. Up-to-date tax laws (1984) are included. You need a Macintosh 512K. Price: $225 (annual updates will be $65). Vendor: Smith MicroSoftware, Inc., P.O. Box 7137, Huntington Beach, CA 92615; (714) 964-0412. (NO FEEDBACK YET)

The Investor is designed as an aid in financial decision making and tax planning. It is a computerized management system for handling stocks, funds, bonds, margin accounts, and much more. The standard analysis reports are possible. A graphics feature allows the user to plot various relationships. Automatic updating by connecting to Dow Jones service is supported. A simulation feature permits the asking of "What if?" questions concerning your buying and/or selling preferences. Price: $150. Vendor: P^3, Inc., 949 Parklane Center, Wichita, KS 67218; (316) 686-2000. (NO FEEDBACK YET)

MindSight brings the power of a sophisticated decision-support system to the Macintosh. With it, you can create business plans and financial models through the application of plain English logic to available data. Built-in communications software allows you to retrieve data from a mainframe, manipulate the data on your Macintosh, and then send the results back to the mainframe. ExecuCom Systems Corporation, 3410 Far West Blvd, Austin, TX 78731; (512) 346-4980.

MindSight	**NIBBLE**	**Nov. 85**	**p. 78**
MindSight	**INFOWORLD**	**Oct. 28, 85**	**p. 42**

SideKick can help you organize your desktop and manage telecommunications. No matter which program you're running, SideKick provides a calendar, appointment alarm, "To do" list, background printing, auto dialing for telecommunications and more—all at the click of a mouse. (Some functions require additional hardware). Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066.

SideKick	**MACUSER**	**Dec. 85**	**p. 46**

PageMaker is a newsletter-publication preparation tool that allows the user to design very sophisticated copy for printing on a LaserWriter or as camera-ready copy. This entire issue was prepared using PageMaker. It is the kind of product that could have been listed under Graphics or Word Processing as well. Users can place MacWrite or Microsoft Word documents on a sample (reduced size) page. Pictures and graphics can easily be incorporated. Graphic images can be cropped as well as proportionally reduced. This is an excellent product with many advanced features that facilitate the preparation of professional-looking publication materials. Available from Aldus Corp., 616 First Avenue, Suite 400, Seattle, WA 98104; (206) 467-8165.

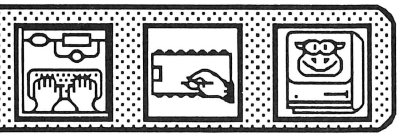
PageMaker	ICON REVIEW	Summer 85	p. 15
PageMaker	MACWORLD	Jul. 85	p. 76
PageMaker	**MACUSER**	**Nov. 85**	**p. 51**

BUSINESS RELATED ARTICLES

The Mac Office	A+ MAGAZINE	Mar. 85	p. 26
Apples for the Office	INFOWORLD	Dec. 31, 84	p. 26
AppleTalk Network	A+ MAGAZINE	Mar. 85	p. 35
AppleTalk Developers	INFOWORLD	Mar. 11, 85	p. 20
LaserFonts	MACWORLD	Feb. 85	p. 45
The LaserWriter	MACWORLD	Feb. 85	p. 70
Mac Goes Pro Forma (MegaForm)	MACWORLD	Jul. 85	p. 84
Macs on the Audit Trail	MACWORLD	Feb. 85	p. 150
Corporate Computing	A+ MAGAZINE	Apr. 85	p. 78
MacProject	MACWORLD	July/Aug 84	p. 52
MacProject (Review)	INFOWORLD	Mar. 11, 85	p. 37
Habadex Appt. Book	INFOWORLD	Oct. 1, 84	p. 62
The Sales Edge Behavioral	MACWORLD	Dec. 84	p. 102
Misc. Business Applications	A+ MAGAZINE	Dec. 84	p. 144
MegaMerge	INFOWORLD	Apr. 8, 85	p. 50
MacPublisher	A+ MAGAZINE	Jun. 85	p. 119
MacPublisher	ICON REVIEW	Summer 85	p. 15
MacPublisher	MACWORLD	Jul. 85	p. 72
MacPublisher	**MACAZINE**	**Mar. 85**	**p. 151**
ReadySetGo	A+ MAGAZINE	Jun. 85	p. 124
Electric Checkbook	A+ MAGAZINE	Jun. 85	p. 134
Electric Checkbook	ICON REVIEW	Summer 85	p. 16
Dollars & $ense	A+ MAGAZINE	Jun. 85	p. 137
Dollars & $ense	MACWORLD	Jun. 85	p. 106
Straight Talk (Dow Jones)	MACWORLD	Jun. 85	p. 86
Chequebook	A+ MAGAZINE	Jun. 85	p. 133
Habadex	COMP.&ELEC.	Mar. 85	p. 38
Consultant	MACAZINE	Jun. 85	p. 81

Consultant	ICON REVIEW	Summer 85	p. 11
BIZMAC	ICON REVIEW	Summer 85	p. 13
Profit Projection	ICON REVIEW	Summer 85	p. 13
Mail Manager	ICON REVIEW	Summer 85	p. 14
Business Essentials	**MACWORLD**	**Nov. 85**	**p. 95**
Chequebook	**MACWORLD**	**Nov. 85**	**p. 136**
Decision Map	**INFOWORLD**	**Oct. 14, 85**	**p. 43**
KABA Check Minder	**MACWORLD**	**Nov. 85**	**p. 144**
MacOneWrite	**INFOWORLD**	**Oct. 14, 85**	**p. 45**
Mail Center	**MACWORLD**	**Dec. 85**	**p. 82**
Accounting Software for Mac	**MACUSER**	**Dec. 85**	**p. 52**

Computer Languages



Microsoft BASIC 2.0 is available from Microsoft. It is significantly better than the earlier version. New features include the ability to create your own custom menu items, dialog boxes, windows, buttons, and much more. The new manual is bigger and better and includes clear and accurate examples of event trapping and a variety of other programs illustrating how to take full advantage of the unique Macintosh interface. It is an interpreted BASIC, so it is a bit slow. However, the new features and an improved user interface make this a very good choice for BASIC users or teachers.

Microsoft BASIC	A+ MAGAZINE	Jun. 85	p. 123,12
Microsoft BASIC 2.0	MACWORLD	Dec. 84	p. 86
Microsoft BASIC 2.0	BYTE	Jan. 85	p. 155
Microsoft BASIC 2.1	A+ MAGAZINE	Jul. 85	p. 119

Programs in BASIC:

AppleSoft to Microsoft	**NIBBLE**	**Sep. 85**	**p. 52**
Rescuing a Document	**MACWORLD**	**Nov. 85**	**p. 163**
Locating Mouse Coordinates	**MACWORLD**	**Nov. 85**	**p. 170**
MacGraph Program	**NIBBLE**	**Sep. 85**	**p. 34**
Mac Investor Program	**NIBBLE**	**Sep. 85**	**p. 6**
Pattern Designer Program	**NIBBLE**	**Sep. 85**	**p. 26**
Mac File Cabinet	**NIBBLE**	**Nov. 85**	**p. 9**
Stop Watch Program	**NIBBLE**	**Nov. 85**	**p. 74**
Autolog Program	**NIBBLE**	**Nov. 85**	**p. 44**
BASIC A Look at ROM	**MACUSER**	**Jan. 86**	**p. 105**
Mi crosoft BASIC Tricks	**NIBBLE**	**Nov. 85**	**p. 42**
MS BASIC Toolbox Windows	**NIBBLE**	**Nov. 85**	**p. 68**

CP/M for your Macintosh. For $395, you get two volumes of documentation from Digital Research and IQ Software with six disks of programs. These programs include CP/M; a C-language compiler, macroassembler, and terminal emulation; and a standard printer driver for setting up your own printer configurations. CP/M 68K programs will run on your Macintosh. Plus CP/M 2.2 (8080) will run on your Macintosh 512K. Write for a Macintosh CP/M Software Catalog. IQ Software, 2229 E. Loop 820 N., Ft. Worth, TX 76118; (817) 589-2000. (NO FEEDBACK YET)

BASIC Compilers. Pterodactyl Software is designing a PC BASIC compiler that will compile your programs on the Lisa (Macintosh XL) so they can run on the Macintosh. It is not only compatible with the IBM PC BASIC compiler, but numerous extensions are added (mouse and QuickDraw routines). The Lisa version of PC BASIC runs under the Lisa Workshop. It is ready now. The Macintosh cross-compiler requires a Lisa with Workshop and Software Supplement. Current prices: Lisa to Macintosh Cross-Compiler —$1,000 (with runtime license); Lisa Compiler—$250 (without runtime license). Vendor: Pterodactyl Software, 200 Bolinas Road #27, Fairfax, CA 94930; (415) 485-0714. (NO FEEDBACK YET)

Neon is an object-oriented programming language. It uses an environment like SmallTalk to allow access to the Macintosh toolbox. Programmers can then use the objects in the toolbox to create programs. Using this language results in very compact and executable code. Portions of any written program can be done in assembly language to improve speed. Included in the language are easy access to QuickDraw routines and a mouse-driven editor. Price: $150. Vendor: Kyria Systems, Inc., 505 N. Lake Shore Drive #5510, Chicago, IL 60611; (312) 822-0624. (NO FEEDBACK YET)

MacNosy is called by some "the disassembler for the rest of us." It is an interactive disassembler that enables Macintosh developers and Macintosh hackers to recover the source code of any Macintosh application file, ROM, or code-type resources in the System file. It runs on the Macintosh 512K and one-megabyte Lisa systems. With it, the developer can do the following: subdivide a program into procedures using a treework and flow analysis, selectively view procedures, produce a reference map for procedure names or trap names, and much more. Use of this product requires knowledge of programming and assembly language. Price: $50. MacNosy is available directly from Jasik Designs, 343 Trenton Way, Menlo Park, CA 94025. (NO FEEDBACK YET)

MacNosy	A+ MAGAZINE	Jun. 85	p. 145

MacTraps is a collection of Macintosh PROCEDURE and FUNCTION calls. With this valuable programmer's resource, you can access the format of many of the codes referenced in *Inside Macintosh.* There are three different types of objects in MacTraps: (1) "Names" describes either the name of the chapter or the name of the section(s), (2) "Nodes" refers to the icons representing the names, (3) "Links" indicates the lines that let you select what chapter you wish by clicking on the line and then linking to the file of interest. Vendor: Network Nexus, 3 Twin Dolphin Dr., Suite 220, Redwood City, CA 94065; (415) 591-2101. (NO FEEDBACK YET)

Macintosh Pascal is an interpreted Pascal. The main difference between it and UCSD Pascal is the screen environment within which you work. Running, stepping, filing, editing, and printing operations can all be performed within windows on the Macintosh screen. Available from Apple Computer.

Microsoft Pascal	MACWORLD	May-Jun. 84	p. 86
Pascal	POP. COMP.	Oct. 84	p. 90
"Why Use Pascal?"	A+ MAGAZINE	Oct. 84	p. 79
Mac Pascal	A+ MAGAZINE	Nov. 84	p. 103
Mac Pascal Primer Part I	A+ MAGAZINE	Mar. 85	p. 95
Mac Pascal Primer Part II	A+ MAGAZINE	Apr. 85	p. 95

MacPascal	MACWORLD	Apr. 85	p. 123
C-Worthy Compiler (Consulair)	A+ MAGAZINE	May 85	p. 143
ExperLogo	INFOWORLD	May 13, 85	p. 52
MacPascal Shell Program	**NIBBLE**	**Nov. 85**	**p. 65**

Manx Software Systems has **Aztec C68K C** for the Macintosh ($499). Also, **Aztec C68K-P** ($199), **Aztec C68K TOOLS** ($249). (800) 221-0440, or in New Jersey call (201) 780-4004. (NO FEEDBACK YET)

ExperLisp is the first complete implementation of LISP on a microcomputer. Developed on a Symbolics 3600, the compiler generates code optimized for the MC68000 microprocessor. The resultant speed combines with the "LISP machine-like" features of the Macintosh to create a LISP environment that is very effective on a microcomputer. This is a great language for developing artificial intelligence and expert-systems applications. Contact ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108; (805) 969-7874. (NO FEEDBACK YET)

ExperLogo is a compiled Logo for the Macintosh. There are enhanced graphics and list-processing features. Applications can be run interpreted or compiled. (NO FEEDBACK YET)

Expert Systems Building Tool. The well-established expert-systems building tool, OPS5, is now available on a personal computer. ExperOPS5 combines the processing power of the Macintosh with the rich LISP features of ExperLisp to create an environment for expert-systems development that rivals those previously found only on expensive LISP machines.

ExperOPS5 is testimony to the power and versatility of ExperLisp. Science Applications International Corporation of La Jolla, California, successfully converted more than 5,000 lines of OPS5 LISP source code into ExperLisp. The resulting implementation of ExperOPS5 retains the function and speed of its Xerox 1108 counterpart while running on the much cheaper Macintosh.

ExperOPS5 features a forward-chaining inference engine coupled with a powerful pattern-matching algorithm. A special added feature is an interface that provides users with complete access to ExperLisp.

ExperOPS5 requires ExperLisp, a Macintosh 512K and an add-on floppy- or hard-disk drive. It is available through selected computer retail outlets, as well as direct from ExperTelligence. Dick Messier, ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108; (805) 969-7874.

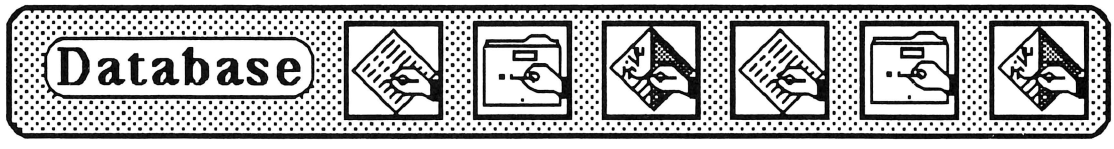
MACKIT (Expert System). MacKit Level 1 is the first of a series of products from Knowledge System Environments, Inc. designed to bring AI technologies to knowledge workers. You are the expert: If you analyze symptoms, deduce probable causes, and recommend actions (for example, if your field is medical diagnosis, financial consulting, automotive troubleshooting, failure mode analysis, information system trouble-desk, equipment troubleshooter, decision support, or strategic planning) then your knowledge can be represented in production rules, and MacKit can provide a productivity tool to model and distribute your problem-solving expertise. Knowledge System Environments, 201 South Road, Dillsburg, PA 17019; (717) 766-4496.

Expert-Systems Builder/ Inference Engine for the Macintosh

An expert systems language, ExperFacts (developed by Mc-Systems) can be used to create working expert systems for most applications. ExperFacts provides all the features needed for flexible knowledge-based programming including backward/forward chaining and Metalevel rules. ExperFact's versatile internal pattern-matching routines allow users to implement powerful concepts such as recursive code and "Frame" representation of the knowledge base. Additional features include *Caching*, a speed-optimization function that automatically stores inferred data for future use; *Justification*, storing of processing data to allow verifications of solutions; *Knowledge Partitioning*, which allows users to group their knowledge base in smaller, more convenient and easily managed partitions; and *Software Hooks*, which provide a facility to access LISP routines or conventional language during processing. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108; (805) 969-7874.

Miscellaneous Articles on Computer Languages

Assembly Language programs	A+ MAGAZINE	Mar. 85	p.103
Assembly Language programming	A+ MAGAZINE	Feb. 85	p.109
Mac Assembler	A+ MAGAZINE	Dec. 84	p.135
MACFORTH	MACWORLD	Nov. 84	p.68
The PostScript Language	MACWORLD	Feb. 85	p.106
PostScript Graphics	A+ MAGAZINE	Mar. 85	p.30
To C or Not To C	A+ MAGAZINE	Apr. 85	p.87
MACFORTRAN	MACAZINE	Jun. 85	p.51
Macintosh Languages	A+ MAGAZINE	Jul. 85	p.135



Microsoft File is a sophisticated data-base product that is well integrated with the Microsoft series of programs (Multiplan, Word, Chart). A more extensive review will be given in the next issue.

Microsoft File	MACWORLD	May 85	p.96
Microsoft File	INFOWORLD	Apr. 29, 85	p.85
Microsoft File	A+ MAGAZINE	Jun. 85	p.107
Microsoft File	ICON REVIEW	Summer 85	p.9
Microsoft File	**NIBBLE**	**Sep. 85**	**p.70**

Filevision is a data base that allows the user to create a picture and then attach records and fields of information to various parts. Consider, for example, designing an on-screen picture of the seating plan in a theater. You could ask questions such as: "Where are the empty seats in the theatre?" or "who's sitting in Row 5, Seat 56?" This package is limited only by the creativity of the user. Price: $195. Telos Software Products, 3420 Ocean Park Blvd., Santa Monica, CA 90405; (213) 450-2424.

Business Filevision integrates a powerful filing and drawing system with a versatile report generator. Telos Software Products, 3420 Ocean Park Blvd., Santa Monica, CA 90405; (213) 450-2424.

Filevision (Telos)	MACWORLD	Jan. 85	p.62
Filevision (Telos)	POP.COMP.	Mar. 85	p.60
Filevision (Telos)	INFOWORLD	Dec. 10, 84	p.49
Filevision	A+ MAGAZINE	Jun. 85	p.107
Teaching with Filevision	**A+ MAGAZINE**	**Dec. 85**	**p.109**

FactFinder is made by Macware and is an electronic "desk drawer" that facilitates manipulation of data within the data base. (800) MACWARE.

FactFinder	MACWORLD	Feb. 85	p.84
FactFinder	INFOWORLD	Mar. 18, 85	p.43
FactFinder	POP. COMP.	Aug. 85	p.111
FactFinder	ICON REVIEW	Summer 85	p.6

Main Street Filer is a data-base management system that can handle 36 fields per record, 65,000 records per file. Can be used for customer/prospect lists, direct mail and renewal lists, appointments, inventory control, accounts payable and receivable reminder files, sales activity and follow-ups. This product has been out for a while so there should be a good deal of feedback available about it. Vendor: Main Street Software, One Harbor Drive, Sausalito, CA 94965; (415) 332-1274, or (800) 824-8757.

Mainstreet Filer	INFOWORLD	Aug. 6, 84	p.57
Mainstreet Filer	MACWORLD	Jan. 85	p.86
Mainstreet Filer	A+ MAGAZINE	Jun. 85	p.107

1STBASE is a relational data-base system from DeskTop Software Corporation, 228 Alexander Street, CN5287, Princeton, NJ 08540; (609) 924-7111.

1stBASE (DeskTop Software)	INFOWORLD	Dec. 12, 84	p.55
1stBASE (DeskTop Software)	MACWORLD	Jan. 85	p.7
1stBASE (DeskTop Software)	INFOWORLD	Dec. 31, 84	p.36
1stBASE	A+ MAGAZINE	Jun. 85	p.122

PFS: File and **Report** make up a simple-to-use data-base management package. Those who are experienced with the PFS: series on the Apple II will recognize the way in which this application is implemented. The basic idea is to prepare a data-input form that facilitates the creation of new records of information. Simple menus then allow for a variety of searching and reporting criteria. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043; (415) 962-0191.

PFS: File	MACWORLD	Jan. 85	p.81
PFS: File	A+ MAGAZINE	Jun. 85	p.107

OverVUE is an information manager for the Macintosh developed by ProVUE Development Corporation. (714) 969-2431 (Calif.). (NO FEEDBACK YET)

OverVUE	A+ MAGAZINE	Feb. 85	p.89
OverVUE	A+ MAGAZINE	Jun. 85	p.107
OverVUE	INFOWORLD	Apr. 1, 85	p.44
OverVUE	INFOWORLD	Jul. 8, 85	p.41
OverVUE	ICON REVIEW	Summer 85	p.7
OverVUE	**MACUSER**	**Nov. 85**	**p.59**
OverVUE	**NIBBLE**	**Sep. 85**	**p.70**

Odesta Helix is an interactive information system made by Odesta. (800) 323-5423, or in Illinois, (312) 498-5615. (NO FEEDBACK YET)

HELIX	INFOWORLD	Apr. 29, 85	p.77
HELIX	A+ MAGAZINE	Jun. 85	p.107
HELIX	ICON REVIEW	Summer 85	p.5
HELIX	**MACWORLD**	**Nov. 85**	**p.89**
HELIX	**NIBBLE**	**Sep. 85**	**p.70**
HELIX	**POP. COMP.**	**Sep. 85**	**p.93**

OMNIS 2 is a data-base program that will calculate, arrange, store, sort, and retrieve data. Data-base layout may have up to 9,600 characters and up to 120 fields. Includes a report generator (compatible with MacWrite). Organizational Software Corporation; (415) 571-0222 (Calif.). (NO FEEDBACK YET)

OMNIS	A+ MAGAZINE	Sep. 84	p.7
OMNIS	A+ MAGAZINE	Jun. 85	p. 107
OMNIS 3	A+ MAGAZINE	Jun. 85	p.107
OMNIS	INFOWORLD	Jul. 15, 85	p.18
OMNIS 3	**MACUSER**	**Nov. 85**	**p.36**
OMNIS 3	**NIBBLE**	**Sep. 85**	**p.70**
OMNIS 3	**POP. COMP.**	**Dec. 85**	**p.70**

Brock Keystroke Data Base by Brock Software Products, Inc., is an electronic file cabinet that enables you to store, find, update, or print information. Has its own report generator. (815) 459-4210 (Illinois). (NO FEEDBACK YET)

MegaFiler is a data-base program that handles mailing lists, multiple-file access, and integration with other Megahaus products, as well as the standard data-base functions. (619) 450-1230 (Calif.). (NO FEEDBACK YET)

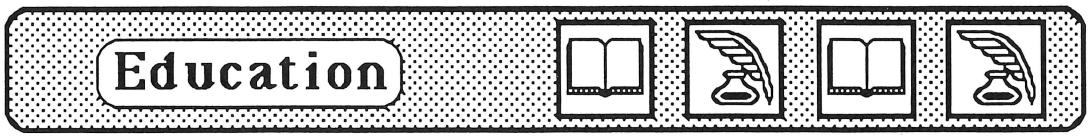
MegaFiler	A+ MAGAZINE	Jun. 85	p.107
MegaFiler	INFOWORLD	Apr. 8, 85	p. 50

DB Master is a very popular data-base that was first implemented on the Apple II series of computers. Available from Stoneware, Inc., 50 Belvedere St., San Rafael, CA 94901; (415) 457-1656.

DB Master	MACWORLD	Jan. 85	p. 85
DB Master	INFOWORLD	Nov. 19, 84	p.57
DB Master	A+ MAGAZINE	Jun. 85	p.107
DB Master for the Mac	POP. COMP.	Jul. 85	p.110

MacLion is a relational data-base manager and applications development system for the Macintosh. It is produced by Computer Software Design, Inc., 1904 Wright Circle, Anaheim, CA 92806; (714) 634-9012. One of the unique features of this data-base is that it has a programming language built in. With this capability, a user can design a job-costing system, bibliographic retrieval system, or order entry system. Some of its other characteristics include: full featured relational data-base management system that allows multiple relational access to your data, a full-screen generator that allows multiple relation access for both inputting and retrieving data, a report writer that helps build reports with data from multiple relations, data transfer to many of the other software programs available for the Macintosh, a data dictionary that maintains the names and descriptions of each file in one place, on-line help, and built-in backup and restore functions that facilitate making copies of your data.

MacLion	INFOWORLD	May 27, 85	p.47
MacLion	A+ MAGAZINE	Jun. 85	p.107
MacLion	**NIBBLE**	**Sep. 85**	**p.70**
MacLion	**POP. COmp.**	**Sep. 85**	**p.93**

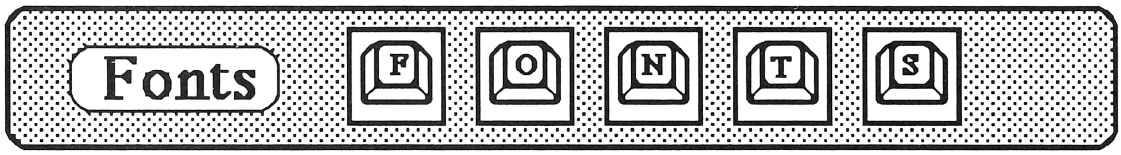


Speed Reader II is a Macintosh program that has already proven successful on IBMs, Commodores, and Apple IIs. Regular use of the program has been shown to double or triple the reading speed (as well as improve comprehension). The program takes advantage of all of the Macintosh features (pull-down menus, mouse use, icons, and on-line help). This program is well orchestrated and, with proper commitment from the user, can really improve the user's reading speed. This application should be quite popular in the college and university environment. For more information, contact Dr. Jan Davidson, Davidson & Associates, Inc., 6069 Groveoak Place #12, Rancho Palos Verdes, CA 90274; (213) 373-0971. (NO FEEDBACK YET)

Speed Reader II	ICON REVIEW	Summer 85	p.22

MacTutor is an authoring system for the Macintosh. The package provides an interface for using pull-down menus, windows, and dialog boxes so that users can design their own applications. MacWrite and MacPaint can be used as part of the overall project-development effort. This package can be used to develop training lessons, supplementary course material, study guides, tutorials, and a variety of other tasks. Available from Computer Learning Systems, RFD 8, Box 375, Concord, NH 03301; (603) 783-4708.

MacAuthor authoring software is an entire course development package, a do-it-yourself set of curriculum formats into which educators can "plug in" their subject materials. There is also an enhanced version (Mentor Curriculum Editor & MacVideo) that links an optical videodisc recorder/player with the Macintosh. This combination allows for audiovisual stills and motion to be shown on a TV monitor alongside text and graphics on the Macintosh. Depending on the options you select, this can be an expensive system. However, it may provide your facility with an effective way to deliver certain types of course material. Initial prerelease versions have been highly regarded.



Fluent Fonts provides dozens of fonts for use in your word-processing applications. Two-disk set is $49.95 from Casady Company, P.O. Box 223779, Carmel, CA 93922; (408) 646-4660. (NO FEEDBACK YET)

Fluent Fonts	ICON REVIEW	Summer 85 p.25

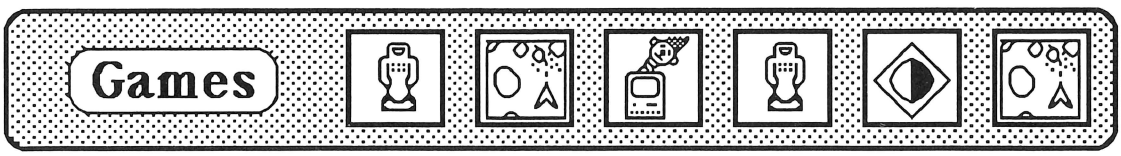
Soft Palette Font (Volume 1) contains a collection of 18 decorator fonts. There are borders and interior design symbols. Price $35. Vendor: Decision Science Software, Inc., P.O. Box 7876, Austin, TX 78713; (512) 926-4527. (NO FEEDBACK YET)

Professional Type Fonts comes with two disks. One disk contains fonts for text and the other contains fonts for headlines. These are modeled after the famous Mergenthaler and ITC typefaces (Times, Helvetica, Roman, and Optima). Sixteen fonts are provided in sizes from 12 point to 24 point (the headline fonts are larger). You need a Macintosh 512K. Prices: Text Fonts-$49.95; Headline Fonts-$69.95. Vendor: Kensington Microware Ltd., 251 Park Ave. S., New York, NY 10010; (212) 475-5200. (NO FEEDBACK YET)

Dayton Math Fonts contains four math fonts (over 700 characters) that are suitable for use in preparing technical manuscripts. Included are all of the standard mathematical symbols, fractions, Greek and Roman alphabets (with tildes, bars, and carets), special integrals, summations, and much more. Price: $29.95. Vendor: Plugh, Inc., 595 Royal Springs, Springboro, OH 45066; (513) 748-2423. (NO FEEDBACK YET)

UltraFonts is a disk with some new fonts for the Macintosh. There are two new packages: Technical and Business Fonts features a variety of fonts for engineers, scientists, doctors, and lawyers that include more than 100 symbols (two Greek language fonts, math symbols, correspondence quality text), UltraFonts Edition Two features 21 fonts in sizes ranging from 6 points to 36 points. There is a borders font, symbols font, international symbols, Macintosh icon font, and more. Price: $29.95 each, or both for $49.95. Vendor: 21st Century Software, Malon Products, Inc., 2306 Cotner Ave., Los Angeles, CA 90064; (213) 829-4436. (NO FEEDBACK YET).

FONTastic	MACWORLD	Dec. 85	p. 96



Ground Zero will be familiar to those who know the arcade game called Missile Command. You must destroy missiles that are heading for several cities that you are protecting. Play gets fast and furious as your skill improves. Lots of fun for video game addicts. The best scores are recorded on disk for posterity.

Airborne is a very exciting arcade-type game that continually challenges your skills. It is a little bit like the game Sabotage (which is familiar to many game players). This game lets you control an anti-aircraft gun and a mortar. You are being attacked by helicopters, infantry, tanks, paratroopers, missiles, jet planes, and cargo planes, just to name a few. Great graphics, excellent, realistic digitized sound. Everyone who plays seems to enjoy it. Available from Silicon Beach Software, 11212 Dalby Place, Suite 201, San Diego, CA 92126; (619) 695-6956.

Airborne	MACAZINE	Jun. 85	p.47

Sargon III is a great way to play chess. It is, however, not easy to beat Sargon (turning off its opening-move library and selecting easy play gives you a fighting chance). The special features of this implementation (windows that track moves, instant replay, move retraction, libraries of openings and closings, piece movement using the mouse rather than notation, and much more) make this the best chess game around. Great for learners or experts.

Sargon III		MACWORLD	Apr. 85	p.84
Sargon III		ICON REVIEW	Summer 85	p.19

Trivia asks a lot of difficult questions and lets you know how you are doing along the way. The program is really a master of ceremonies. You don't enter the answer, you say it aloud and then ask Trivia to display the correct answer. Players in the game decide if your answer is close enough. There is a General Knowledge disk with 5,000 questions. You can be timed, prevent certain categories from being continually selected, and play at various skill levels. The five categories are entertainment, sports, geography, history, and literature. You can make up your own questions and answers if you wish (lots of potential with this). Price: $49.95. Vendor: Mirage Concepts, 4055 W. Shaw #108, Fresno, CA 93711; (209) 227-8369.

Through the Looking Glass used to be the game called ALICE. It is a program that was developed at Apple Computer during the early stages of the Macintosh project. You may have an early version of the game. The latest (and legitimate release) of the program is much better than the original. The basic idea is that you select a chess piece that you (in the role of Alice) then become. A game of real chess is played with no delay between moves. It's just you against the other player (the Macintosh). This is a fast game. The new release has several versions, including mutations, erosion, Mirror-Mouse, and Upside Down. In addition, you can create your own pieces so that the game becomes more "personalized." Lots of fun with this one. Price: $39.95. Vendor: Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; (800) 538-9696 or (800) 662-6238.

Through the Looking Glass	MACWORLD	Mar. 85	p.85

DejaVu is an exciting new adventure game that makes excellent use of the Macintosh user interface. It's a great mystery with lots of humor. Once you start playing this one, it is very difficult to stop—certainly a fine addition to one's entertainment library. Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062; (800) 221-9884, (or in Illinois (800) 942-7315).

Deja Vu	**MACUSER**	**Jan. 86**	**p.89**

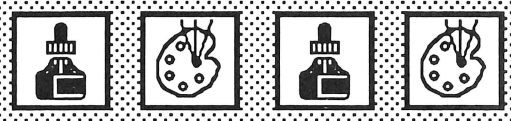
MacPoly is a game consisting of a hundred jigsaw puzzles that range from easy to downright impossible. The jigsaw puzzles are polyominoes, shapes made of squares, which you drag, spin, and flip into place.

MacPoly is the largest collection of these puzzles ever published in any form. Some puzzles are by the old masters, but most are new. Solutions provided for all but the impossible ones. The manual explains how to play, and why some puzzles are impossible, and contains a bibliography. The program runs on a Macintosh 128K or 512K. Sabaki Corporation, Dept. 3000, P.O. Box 8217, Rego Park, NY 11374; (718) 897-9638.

Articles on Miscellaneous Games

Transylvania (Adventure game)	A+ MAGAZINE	Sep. 84	
Transylvania	MACWORLD	May 85	p.79
Enchanter	MACAZINE	Apr. 85	p.45
Sorcerer	MACAZINE	Apr. 85	p.45
Load Runner	MACAZINE	Apr. 85	p.45
Forbidden Quest	MACWORLD	May 85	p.76
Hitchhikers Guide to the Galaxy	MACWORLD	May 85	p.76
Millionaire	MACAZINE	Apr. 85	p.45
Millionaire (Investment game)	A+ MAGAZINE	Sep. 84	
MacSlots (Slot Machines)	MACWORLD	Nov. 84	p.80
MacJack	MACWORLD	Nov. 84	p.80
Gateway	**MACWORLD**	**Nov. 85**	**p.133**
Gato	**MACUSER**	**Nov. 85**	**p.38**
Gato	**MACWORLD**	**Dec. 85**	**p.125**
Masterpieces (Puzzle)	**A+ MAGAZINE**	**Nov. 85**	**p.169**
Psion Chess	**A+ MAGAZINE**	**Dec. 85**	**p.179**
MacMatch	**A+ MAGAZINE**	**Nov. 85**	**p.171**
Universe II	**MACUSER**	**Jan. 86**	**p.95**

Graphics/Design



Microsoft Chart is a business graphics package from Microsoft. It integrates well with Multiplan, Word, and File (other Microsoft products). This is an excellent package for creating and drawing graphs either by directly entering the raw data or by transferring it from a spreadsheet. The user can choose from bar charts, column charts, area charts, line graphs, pie diagrams, scatter diagrams, and combinations. Various statistical functions can be performed on the data (and created as a separate series). It is possible to plot a linear regression line of the data as well as an exponential growth curve. The final chart can be extensively enhanced with legends, titles, shadings, text, scaling, and a wide variety of other techniques. This is easy to learn and quick to use. Should be part of your library. Microsoft Corporation, 10700 Northup Way, Bellevue, WA 98004; (800) 426-9400.

Microsoft Chart	MACWORLD	May-Jun. 84 p.72
Microsoft Chart	INFOWORLD	Jan. 14, 85 p.56
Microsoft Chart	MACWORLD	May 85 p.40
Presentation Graphics on the Macintosh by Lambert (Microsoft)		

Slide Show Magician takes your MacPaint documents and arranges them into a slide show presentation. Anything you can put on a Macintosh screen can be used in the slide show. You can control how long each frame stays on the screen, or even let the show run continuously. There are 16 movie-type special effects. These include wipes, curtains, fades, and much more. This is a very easy package to use and really does allow you to create "magical" slide shows. You can place "buttons" on your slide, add text, animate text, use the mouse to point and click, and even let your "shows" be sent to someone else for running on their computer (even if they do not have Slide Show Magician). Many vendors use this product to display their products' features to potential customers. It may be a good addition to your software library. Price: $59.95. Vendor: Magnum Software, 21115 Devonshire St., Suite 337, Chatsworth, CA 91311; (818) 700-0510.

Slide Show Magician	ICON REVIEW	Summer 85 p.12

ClickArt is a collection of picture disks. At present, there are three disks: (1) Personal Graphics (people, cartoons, arrows, and miscellaneous), (2) Publications (three-column layout guides, borders, maps, letterhead, and more), and (3) Letters (24 large alphabets). Vendor: T/Maker Graphics, 2115 Landings Drive, Mountain View, CA 94043.

Special Effects was developed by T/Maker Graphics (above) as a supplement to MacPaint. When installed on your MacPaint disk (easily done), you have four additional tools available for your use: (1) 360-degree rotation of text (a great addition by itself), (2) a distortion effect, (3) an ability to slant text and images, and (4) a tool to add perspective to a drawing. Well worth it for heavy MacPaint users.

ClickArt Pictures	INFOWORLD	Aug. 13, 84 p.61

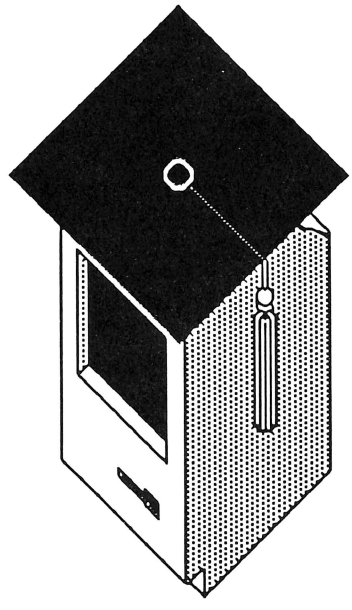
Buildings. Hayden Software Company has several Macintosh picture disks available for doing some very thorough designing. These are not merely "clip art" but rather "structural pieces" that can be assembled into buildings, landscapes, and so on. Currently available are daVinci: Buildings, Building Blocks, Commercial Interiors, Interiors, and Landscapes. Vendor: Hayden Software Company, 600 Suffolk Street, Lowell, MA 01853; (617) 937-0200.

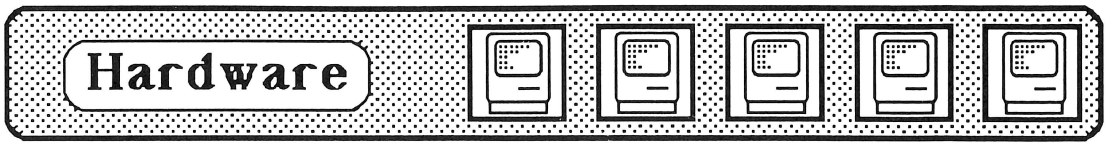
VideoWorks is a package designed to help you animate the images on your Macintosh screen. It is a comprehensive package that includes a Master disk, a "movies disk" (with sample animations), and a disk with a lot of artwork on it in the form of MacPaint drawings. Pictures are brought into VideoWorks with a desk accessory called ArtGrabber (a very nice tool all by itself). You can also draw directly in VideoWorks. The documentation is excellent and guides you through the development of animation. We will be looking at this package more closely in the next issue. It is an excellent example of a program that takes full advantage of the capabilities of the Macintosh. Vendor: Hayden Software, 600 Suffolk Street, Lowell, MA 01854; (617) 937-0200.

VideoWorks	A+ MAGAZINE	Aug. 85	p.68

Other Items of Interest on Graphics

MacPaint	A+ MAGAZINE	Aug. 85	p.143
MacDraw	MACWORLD	Jul. 85	p.121
MacDraw	**MACUSER**	**Nov. 85**	**p.74**
MacTracks	ICON REVIEW	Summer 85	p.26
Animation Toolkit I	MACWORLD	Jun. 85	p.97





ThunderScan is a hardware attachment that can make any printed image into a detailed, high-resolution Macintosh graphic—turning the ImageWriter into an "image reader." The device replaces the ImageWriter ribbon cartridge that will scan any image you can roll into the printer and send it to the Macintosh. You can enlarge an image up to 400 percent or shrink it to 25 percent. The device is easy to set up, focus, and use. The software is well-written, MacPaintlike in its design, and even incorporates a new auto-scrolling feature when viewing a large picture. When the scanning is done, the gray scales are retained. You can then adjust the brightness and/or contrast to your liking. Works well for transferring images from magazines, pictures, photographs or what have you. Price: $229. (415) 254-6581 (Calif.).

ThunderScan	MACAZINE	Apr. 85	p.10
ThunderScan	MACWORLD	Apr. 85	p.76
ThunderScan	A+ MAGAZINE	Aug. 85	p.136

MouseAround is a drawing tool you insert the mouse into to give you greater control, as well as a guide to facilitate drawing or tracing. It is a 12 inch by 12 inch plastic drawing-surface board with a built-in mechanism for holding the mouse. Vendor: FrontRunner Computer Industries, 316 California Ave., Suite 712, Reno, Nevada 89509; (702) 786-4600. (NO FEEDBACK YET)

MacTablet is a graphics tablet that connects to the Macintosh that allows for very detailed drawing or tracing. It works with MacPaint, MacDraw, and a variety of other software. Utilizes a pen complete with buttons. It seems to perform as well as the mouse in normal situations and much better in detail drawing. More about this product next time. Available from Summagraphics Corp., 777 State St. Extension, Fairfield, Conn. 06430; (203) 384-1344.

MacTablet	**MACUSER**	**Jan. 86**	**p.83**

Mac•Turbo•Touch by Assimilation Process is a track-ball input device for the Macintosh. It can be used instead of the mouse or right along with it (the mouse plugs into the back of the Turbo Touch). The Turbo Touch features two buttons and a track ball that give surprisingly good control over cursor movement. It's not great for fine drawing, but certainly provides a faster way to move the cursor around the screen. Try one out at your dealer. Price: $129. (800) MAC-5464, or in California (800) 421-0243, or in Canada (404) 446-0797.

Mac Turbo Touch	A+ MAGAZINE	Apr. 85	p.72

MacStation by MicroRain is a stand with storage space for the Macintosh, ImageWriter, and external disk drive. (800) 547-4000, Dept. 410, or in Oregon or outside the U.S.A., (503) 684-3000, Dept. 410. (NO FEEDBACK YET)

MacDrive by Tecmar, Inc., can be a 10-megabyte fixed hard disk or a 5-megabyte removable hard disk (with an option of adding five more megabytes). Phone: (216) 349-0600 (Ohio). (NO FEEDBACK YET)

OmniDrive, a network-ready hard disk, by Corvus Systems, Inc. Price: $1,795 for the 5.5-megabyte model. (408) 559-7000 (Calif.). (NO FEEDBACK YET)

Hard-Disk Drives	A+ MAGAZINE	Dec. 84	p.116
Hard-Disk Drives	MACWORLD	Dec. 84	p.70
Hard Disk Drives for Mac	POP. COMP.	Apr. 85	p.100
Hard Disk Drives for Mac	ICON REVIEW	Mar. 85	p.28

Hyperdrive is a hard disk that is built into your Macintosh. It stores 10 megabytes of data, and is extraordinarily fast. It transfers data at a 5-Mbit-per-second rate—up to seven times faster than external drives. Files can be divided up into 32 drawers of any size you wish. Resizing takes place automatically. Works quite well with the Macintosh Finder. More on this product next issue. General Computer Company, 215 First Street, Cambridge, MA 02142; (800) 422-0101. Consortium pricing available.

Hyperdrive Hard Disk	A+ MAGAZINE	Mar. 85	p.15

The Keeper is a hard-disk system made for the Macintosh by Micro-Design of Austin, Texas. Built-in printer buffer; runs four to six times faster than floppy disks. Adds up to 33 megabytes of storage. (800) 531-5002, or in Texas, (512) 441-7890. (NO FEEDBACK YET)

The Bernoulli Box is a cartridge disk system made by IOMEGA Corporation of Utah (1821 West 4000 South, Roy, Uah 84067). Has 5-megabyte removable cartridges. (800) 556-1234, X215, or in California, (800) 441-2345, X215. The Bernoulli Box uses highly reliable, easily transportable, 5-megabyte cartridges. This allows users who share Macintoshes or peripherals to "take their data files along with them." IOMEGA has some very attractive pricing arrangements for colleges and universities. This hard disk was used to help prepare Volume 1, Number 1 of **Wheels for the Mind**. It worked without any problems whatsoever, was carted around, used with a single user, connected to AppleTalk, and performed as advertised.

Bernoulli Box	**INFOWORLD**	**July 29, 85**	**p.47**

The Bernoulli Box Network Server is a high-performance, mass-storage subsystem using two 10-megabyte removable cartridge drives developed by IOMEGA. It has been designed to interface with the AppleTalk network. The server has been carefully designed to provide the benefits of mass storage to multiple users. This is accomplished by partitioning the disk cartridges into 1-megabyte multiples that a user may select from. These partitions can be password protected. This server allows any user to have multiple partitions on the Macintosh at one time but no partition may be used by more than one user at the same time. To back up 10 megabytes requires only about 4 1/2 minutes. (NO FEEDBACK YET)

Composite Video Adapter from Mentauris connects the Macintosh to a wide range of commercial video monitor and projection equipment. (512) 396-1565 (Texas). (NO FEEDBACK YET)

MACQUISITION is a set of tools for collecting and logging data from laboratory instruments and industrial sensors. The user can define an application using a simple spreadsheet (right now, Multiplan) template. Data is then automatically collected, analyzed, charted, and reported. Macquisition uses the Taurus One/05 data-acquisition and control peripheral. This unit interfaces with a wide variety of signals, including analog input, digital input/output, analog output, and counters. (There are 16 analog input channels and 16 digital input/output channels.) The unit offers 12-bit resolution on analog inputs and outputs with analog input gains from 1 to 1,000. Systems begin at $2,595 without a Macintosh and can be configured with a variety of options. Contact the vendor directly for information about pricing, discounts, multiuser systems, and the like. There will be a more extensive review with feedback from some Consortium test sites in the near future. Small Business Computers of New England, 4 Limbo Lane, P.O. Box 397, Amherst, NH 03031; (603) 673-0228.

MouseHouse is, quite simply, a holder for the Macintosh mouse. It is used when the machine is not in use. It attaches to either side of the Macintosh with removable Velcro strips. The MouseHouse matches the color and contours of the mouse and looks like an integral part of the machine's exterior. Suggested retail price is $5.95. Contact FrontRunner Computer Industries, 316 California Ave., Suite 712, Reno, NV 89509; (702) 786-4600.

Print 'n' Switch allows you to use both an ImageWriter and a letter-quality printer with your Macintosh. It plugs into the printer port on the rear of the machine (leaving the modem port free to be used by other peripherals). The ImageWriter and letter-quality printer plug directly into a small Print 'n Switch box. At the press of a button, either printer is activated. Works with most letter-quality printers. Price: $119.95. FrontRunner Computer Industries, 316 California Ave., Suite 712, Reno, NV 89509; (702) 786-4600. (NO FEEDBACK YET)

MacEnhancer lets Macintosh users connect additional peripherals. It adds one IBM-type connector for parallel printers, and two IBM-type connectors for serial printers, modems, and host connections. The package includes printer-driver and terminal-emulation software. Supports almost all dot-matrix printers, but only the Epson LQ1500 and Toshiba P1351 letter-quality printers at present. Price: $249. Microsoft Corporation, 10700 Northup Way, Box 97200, Bellevue, WA 98009. (NO FEEDBACK YET)

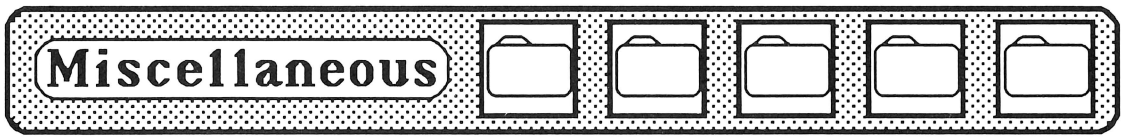
MacEnhancer	A+ MAGAZINE	Mar. 85	p.82
MacEnhancer	**INFOWORLD**	**July 29, 85**	**p.52**
MacEnhancer	**MACWORLD**	**Nov. 85**	**p.154**

MacCharlie provides a coprocessor that enables Macintosh to run IBM PC software. It takes only five minutes to install, and makes switching between IBM and Macintosh applications as quick as a mouse. Dayna Communications, 50 South Main Street, Suite 530, Salt Lake City, UT; (800) 531-0600.

MacCharlie	**POP. COMP.**	**Dec. 85**	**p.65**
MacCharlie	**MACUSER**	**Dec. 85**	**p.60**

MacADIOS is a powerful tool to be used by scientists, engineers, teachers, and production facilities. It turns the Macintosh into a powerful laboratory workstation that can control and monitor scientific experiments and processes. In seconds, laborious data-taking tasks can now produce attractive graphs of a quality unmatched by computers in this price range. GW Instruments, 3 Ames Street, Cambridge, MA 02139; (617) 577-1524.

Megabyte Mac	INFOWORLD	Aug. 12, 85	p.47
MacVision	MACWORLD	Apr. 85	p.71
MacIntizer	MACUSER	Jan. 86	p.86



Mail Center is a program that allows Macintosh users connected via the AppleTalk Personal Network to communicate by means of computerized mail. Letters, memos, charts, graphs, spreadsheets, and programs created on a Macintosh may be sent to any other Macintosh. The information may be sent without interrupting the person receiving the mail. Mailbox icons identify where mail can be sent and a "mail receiver" desk accessory actually receives any mail that is sent to that user. A receive log keeps a list of all mail received by a given mailbox. Videx, Inc., Corvallis, OR 97330; (503) 758-0521. (NO FEEDBACK YET)

The DNA Inspector is a set of Macintosh programs used for analyzing DNA sequences. In effect, the programs, written in Microsoft BASIC, allow recombinant DNA experiments to be designed with the computer before they are attempted in the lab. Besides being of value to the scientist as a tool, the programs can be used by the nonscientist to learn about the techniques of modern molecular biology, or as a teaching tool by educators. The programs are available for $109 from TEXTCO. The package includes the DNA Inspector Programs, the DNA sequence of several recombinant DNA vectors (pBR322, M13 phage, and SV40), and instructions. User must supply Microsoft BASIC. (A Version 2 offering many new features is under development and should be available in the summer.) Add $5 for overseas shipment. Textco, 27 Glison Rd., W. Lebanon, NH 03784 (NO FEEDBACK YET)

Scientific Analysis Program is used to solve both numerical and statistical problems. It requires Microsoft BASIC. With the two disks provided, the user can solve linear, nonlinear, complex, and sets of simultaneous differential equations. In addition, the program does linear regression and curve fitting, calculates definite integrals, and solves matrix equations. Price: $35. Vendor: PCA Software, P.O. Box 1231, Arlington, TX 76010; (817) 860-5498. (NO FEEDBACK YET)

MUSIC RELATED

MusicWorks is great fun—especially for those skilled in music. However, anyone can learn to use this program and have a good time. You can edit, compose, and then play your music. This can be done in MacPaintlike fashion on a predesigned staff, or you can use a facsimile of a piano. There are four voices available, 10 instruments, and a variety of playing styles. Lots of "data disks" of music are appearing at user group meetings and as freeware. When your Macintosh is connected to an external speaker (via the built-in audio jack), it really sounds great. Price: $79.95. Vendor: Hayden Software, 600 Suffolk St., Lowell, MA 01854; (800) 343-1218. (NO FEEDBACK YET)

MusicWorks	MACWORLD	Jun. 85	p.74
MusicWorks	MACAZINE	Mar. 85	p. 34
MusicWorks	A+ MAGAZINE	May 85	p.113

SongPainter is a music program that comes with built-in chords, scales, and an orchestra of instruments. The user can combine instruments, pitch, rhythms, and chords using a unique picture-painting scheme. There are some special effects, as well as accents for rhythm, adjustable tempo and volume, and a Help screen (when needed). Vendor: Rubicon Publishing, 6300 La Calma Dr., Suite 100, Austin, TX 78752; (512) 454-5004. (NO FEEDBACK YET)

Concertware	MACAZINE	Mar. 85	p.29
Concertware	MACWORLD	Jun. 85	p.53
Concertware	**MACUSER**	**Nov. 85**	**p.38**
MusicType	MACAZINE	Mar. 85	p.34
Music Character Set	MACAZINE	Mar. 85	p.34
MAC Music	MACAZINE	Mar. 85	p. 34
Professional Composition	MACAZINE	Jun. 85	p.12

MAC•MEMORY•DISK by Assimilation Process lets you allocate a portion of the RAM resident in your Macintosh 512K and treat it like a disk. Significantly increases the speed of many applications. Price: $29. (800)MAC-5464 or in California, (800) 421-0243 or in Canada, (404) 446-0797.

Mac Memory Disk	A+ MAGAZINE	Mar. 85	p.86
RAM DISK	MACWORLD	Jun. 85	p.32
Mac Memory Disk	ICON REVIEW	Summer 85	p.26

MacLabeler helps you keep track of what's on your disks. This application creates labels that will automatically list up to 20 file names. You can choose whether a file is included on the list or not. A helpful utility. Price: $49.95. Vendor: Ideaform Inc., P.O. Box 1540, Fairfield, IA 52556; (515) 472-7256. (NO FEEDBACK YET)

MacLabeler	ICON REVIEW	Summer 85	p.26

MacCalendar by Videx, Inc. is a time management tool. It combines the alarm clock with a calendar and a notepad. It can be installed as a desk accessory to be available whenever you need it. Attractive and easy to use, this one is only useful if you are disciplined enough to keep entering your appointments and regularly check on their status. Price: $89. (503) 758-0521.

P/C Privacy is a data encryption system that protects your text or graphics files from being viewed by others. The user "decodes" an encrypted file by entering a key word, which can be changed. Price: $140. Vendor: MCTel, Inc., 3 Bala Plaza E #505, Bala Cynwyd, PA 19004; (800) 628-3584, or in Pennsylvania, (215) 668-0983. (NO FEEDBACK YET)

SmoothTalker is an exciting product that converts plain English text, from either the keyboard or a MacWrite text document, into high-quality and natural-sounding speech. Mouse-driven commands allow you to specify the speed, pitch, tone, and volume to produce both male and famale voices. A dictionary can be created with words that SmoothTalker doesn't speak particularly well. Several software developers are incorporating this product into applications that will soon reach the market. A demonstration is available 24 hours a day by calling (714) 536-0086. The technology can be obtained in two ways: as a stand-alone retail product, and as licensable software modules for the developers and universities that can be embedded within the author's own programs. Some changes currently under way include enhanced phonetic capability, faster conversion, and use as a "driver" from other language programs. First Byte, 2845 Temple Avenue, Long Beach, CA 90806; (213) 595-7006, (800) 523-8070, or in California, (800) 624-2692.

SmoothTalker update.
The latest version of SmoothTalker came out in late May 1985. Enhancements include two voices, male and female; ability to call SmoothTalker from your own programs; faster text-to-speech conversion on Macintosh 512K; ability to insert timed delays anywhere in a document being spoken; ability to automatically repeat passages; ability to show phonetic equivalents; and a new on-line user's guide.

SmoothTalker	MACAZINE	Mar. 85	p.49

TurboCharger puts more horsepower under the hood of your Macintosh by speeding disk access. Its operation is totally transparent, as it analyzes disk usage to achieve a dramatic increase in the performance of most Macintosh software. Nevins MicroSystems.

FlashFinder is a program that allows users to replace Apple's icon-oriented Finder with one that saves disk space, as well as speeding up application load time. When a disk that has *FlashFinder* on it is booted, the Application Launcher Dialog Box will appear, listing all the applications available on the disk. You can open an application, use the desk accessories, go to the File Manager, or go to the standard Macintosh desktop environment.
The File Manager lists all the files on a disk. However, if you highlight an application in the Application Launcher and then go to the File Manager, only the files associated with that application will be listed. You can choose the List All option to see the remaining files. From the File Manager, you can quickly open, rename, or delete a file.

FlashFinder also allows you to eject disks and switch disk drives. UNICOM, Software Development Group, 297 Elmwood Ave, Providence, RI 02907; (401) 467-5600.

Airplane Construction Kit	**MACUSER**	**Nov. 85**	**p.36**
Time Base (Calendar)	**A+ MAGAZINE**	**Nov. 85**	**p.164**
Mind Prober	**MACAZINE**	**Apr. 85**	**p.43**
Mind Prober	**MACWORLD**	**Nov. 85**	**p.149**

Spreadsheets

Multiplan by Microsoft is a spreadsheet that is unusually easy to use. This application takes advantage of the Macintosh user interface to provide a very powerful spreadsheet with many built-in functions. Microsoft Corporation, 10700 Northup Way, Bellevue, WA 98004; (800) 426-9400.

Multiplan	MACWORLD	Apr. 84	p.72
Investing with Multiplan	MACWORLD	Apr. 84	p.94
Multipan and Chart	MACWORLD	Sept./Oct. 84	
Multiplan	MACWORLD	Dec. 84	p.142
Multiplan (Financial Planning)	MACWORLD	May 85	p.92
Spreadsheets for the Mac	POP.COMP.	Aug.85	p.12
QuartetICON REVIEW	Summer	p.	4
Multiplan Made Easy by Ettlin (Osborne/McGraw-Hill)			
Click On Worksheet	**INFOWORLD**	**July 29, 85**	**p.50**

Jazz is an integrated package that includes word processing, a data base, a spreadsheet, graphics, and communications. It features a number of powerful built-in functions. A new feature called "HotView" ties data in one application to data in any or all of the others. Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142.

Jazz Ships to Eager Dealers	INFOWORLD	Jun. 10, 85	
JAZZ	ICON REVIEW	Summer	p.1
JAZZ	**INFOWORLD**	**July 22, 85**	**p.16**
JAZZ	**INFOWORLD**	**July 22, 85**	**p.41**

Microsoft Excel is not just a new program—it's a new standard. It offers the best of Lotus 1-2-3, and more: a spreadsheet that's big (256 columns and 16,384 rows) and incredibly fast; powerful, easy-to-use macros; the full capability of Microsoft Chart; and two-way file capability that lets your Excel files work with Multiplan, Chart, and 1-2-3 files.

• View, consolidate, and link worksheets and charts just by pointing and clicking the mouse.

• Use more than 80 built-in mathematical functions, including all financial functions, or create your own.

• Create powerful timesaving macros easily by having Excel record your actions or by programming them yourself.

• Design your worksheets to emphasize anything you want by varying fonts and font sizes or by using boldface, italics, and borders to call attention to specific cells or regions.

• Choose from a list of 19 built-in numerical formats (including currency, date, time, and percentage) or create your own custom formats.

• Build "What if?" tables and quickly solve multiple-variable formulas.

• Build presentation-quality charts instantly, because worksheets and charts are linked automatically.

Microsoft Corporation, 10700 Northrup Way, Box 97200, Bellevue, WA 98009; (206) 828-8080.

Excel versus Jazz	INFOWORLD	May 20, 85	p. 17
Excel for the MAC	INFOWORLD	May 27, 85	p. 28
EXCEL Macros	MACWORLD	Dec. 85	p.69
MACROMAKER New for EXCEL	MACUSER	Dec. 85	p.40

 CRUNCH is a power spreadsheet for the Macintosh. In two of the most important measures of the spreadsheet power—size and speed—Crunch beats all other spreadsheets. The Crunch spreadsheet program stores substantially more cells than Lotus 1-2-3, and performs calculations noticeably faster.

In addition to size and speed, Crunch offers you more features than any other spreadsheet. The *right* features, ones you can really use in making faster and better decisions. These Crunch power features:

• Provide more built-in functions than other spreadsheets, and let you create your own custom functions.

• Link spreadsheets, so that you can quickly and easily share information from several spreadsheets without retyping numbers.

• Show you more of your spreadsheet all at once, because Crunch lets you display twice as many rows of figures as any other spreadsheet for the Macintosh.

• Provide special "auditing" features that let you review your spreadsheets's structure and help ensure that your decisions are based on sound data.

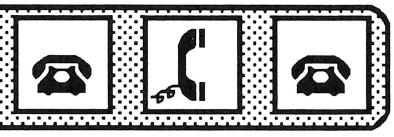
PALADIN Software Corporation, 2895 Zanker Road, San Jose, CA 95134.

CRUNCH	INFOWORLD	Aug. 12, 85	p.47
CRUNCH	MACUSER	Jan. 86	p.61

INTEGRATED PACKAGES

Ensemble	INFOWORLD	May 20, 85	p.47
Ensemble	ICON REVIEW	Summer 85	p. 3
Integrated Software MeetsMac	POP COMP.	Jun. 85	p. 11
Microsoft Integrated Series	POP COMP.	Jun. 85	p.104
JAZZ, EXCEL, and CRUNCH	**NIBBLE**	**Nov. 85**	**p.52**

Telecommunications



MacTerminal is a data communications program from Apple that, when used with a modem, allows the Macintosh to emulate other data terminals (IBM 3278, DEC VT100, DEC VT52, and TTY). It provides access to a variety of electronic information services, and data can be easily transferred back and forth between your microcomputer and a mainframe. Available from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; (800) 538-9696.

MacTerminal	MACWORLD	July/Aug. 84	p.64
Mac Telecommunications by Erickson/Sayre	(Osborne/McGraw-Hill)		

The Apple Modem is a hardware product available from Apple for use in making the telephone link between your Macintosh microcomputer and a mainframe. Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014 (800) 538-9696.

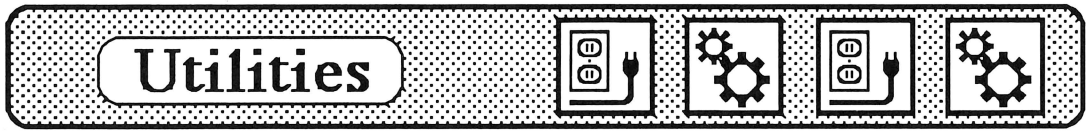
Apple Modem/MacTerminal	A+ MAGAZINE	Mar. 85	p.118
Apple Modem 1200	MACWORLD	July/Aug. 84	p.64

Telecommunications Related

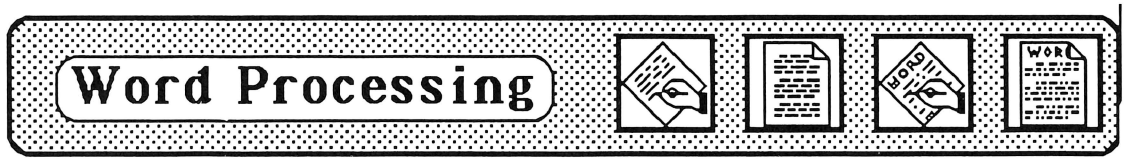
PC TO MAC AND BACK	INFOWORLD	Mar. 18, 85	p.47
MACPhone	COMP.&ELEC.	Mar. 85	p.38
MACMODEM	MACWORLD	Apr. 85	p.94
SMARTCOM II	**MACWORLD**	**Dec. 85**	**p.88**
SMARTCOM II	**A+ MAGAZINE**	**Nov. 85**	**p.14**
Red Ryder	**MACWORLD**	**Dec. 85**	**p.92**
inTouch	**MACWORLD**	**Dec. 85**	**p.90**

Mac•Daisy Wheel•Connection by Assimilation Process can tie the Macintosh to the Apple Daisy Wheel Printer, the Brother (HR series), the C-Itoh (Starwriter), the Daisywriter, the Diablo, the NEC Spinwriter, and the Qume (Letterpro and Sprint II Series). This is a very easy program to learn and it works well. Price: $99. (800) MAC-5464, or in California, (800) 421-0243, or in Canada, (404) 446-0797.

NEC Information Systems, Inc. matches the Macintosh with a Spinwriter printer. (800) 343-4419, or in Massachusetts, call (617) 264-8635. (NO FEEDBACK YET)



Accessory Pak I	**MACUSER**	**Nov. 85**	**p. 3**
Accessory Pak I	**NIBBLE**	**Nov. 85**	**p. 78**
Mactracks	**A+ Magazine**	**Nov. 85**	**p. 173**
Banner Maker	**MACWORLD**	**Nov. 85**	**p. 166**
Switcher	**INFOWORLD**	**July 22, 85**	**p. 40**
MacMate	**MACWORLD**	**Nov. 85**	**p. 151**
Paint Cutter	**MACWORLD**	**Nov. 85**	**p. 129**



Mac•Spell•Right by Assimilation Process helps correct spelling and provides a thesaurus for your use. Works only with the new disk-based MacWrite. Easy to use. Price: $89. (800) MAC-5464, or in California (800) 421-0243, or in Canada, (404) 446-0797.

Mac Spell Right	A+ MAGAZINE	Feb. 85	p.100
Mac Spell +	ICON REVIEW	Summer 85	p.10

Hayden: Speller is a spelling-checker program that works with either MacWrite or Microsoft Word. It is not necessary to switch back and forth between it and your application. Its dictionary contains over 22,000 entries; you may also create dictionaries of your own. Price: $79.95. Vendor: Hayden Software, 600 Suffolk St., Lowell, MA 01854; (800) 343-1218. (NO FEEDBACK YET)

ThinkTank is an idea processer that provides an outline format for you to "arrange your ideas." Great for preparing outlines of research papers, reports, articles, or to-do lists. This is not a full-fledged word processor and does not (as far as we know) interface with one (such as MacWrite). Living Videotext, Inc. in Mountain View, California; (800) 556-1234, X213, or in California, (800) 441-2345, X213. (NO FEEDBACK YET)

ThinkTank 512	A+ MAGAZINE	May 85	p.102
ThinkTank 512	**INFOWORLD**	**Jul. 29, 85**	**p.45**
ThinkTank	**MACUSER**	**Jan. 86**	**p.52**

MegaMerge works with MacWrite to provide the capability to create and merge mailing lists with documents, print mailing labels, and chain documents together so they print as one long document. Available from Megahaus. (619) 450-1230. (NO FEEDBACK YET)

Microsoft WORD is a very powerful word-processing program from Microsoft Corporation. It seems to have some significant advantages over the current versions of MacWrite. Additional information and product comparisons will appear in the next issue.

Some features in Microsoft Word and not in MacWrite:

- Footnoting capability
- Paragraph formats
- Built-in glossary
- Multiple-column formats
- List processing (mail merge)
- Multiple windows (documents) on screen
- Mouse selection shortcuts
- Built-in HELP feature

Word	MACWORLD	July/Aug. 84	p.64
Microsoft Word	INFOWORLD	Apr. 22, 85	p.42
Microsoft Word	MACAZINE	Mar. 85	p.43
Word	ICON REVIEW	Summer 85	p.10

Microsoft WORD Made Easy by Hoffman (Osborne/McGraw-Hill)

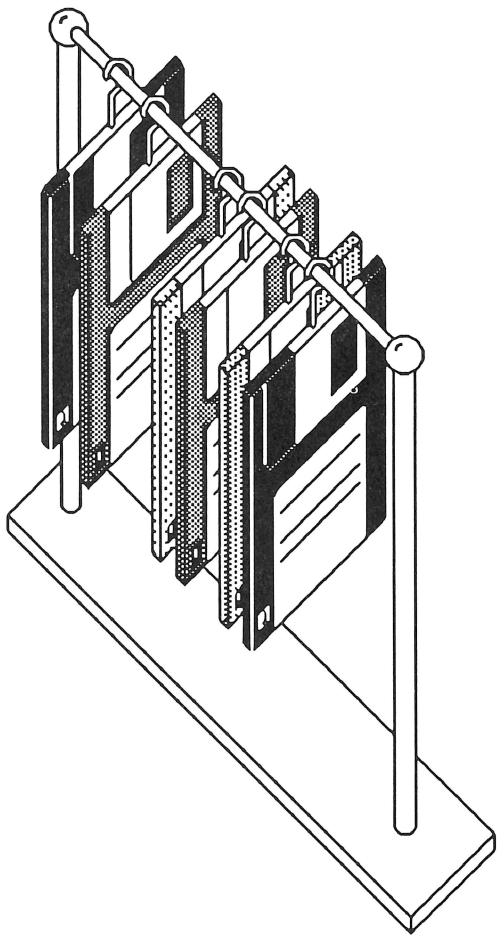
Professional Bibliographic System by Personal Bibliographic Software, Inc. is a data-base system for managing, searching, and printing bibliographic records. It can be useful to any professional who wishes to maintain an orderly library, whether it be a special department library or a personal library.

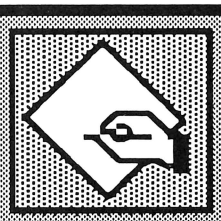
Macintosh technology has been fully utilized, with pull-down menus and print options that allow underlining, italics, or boldface type in any field desired. In addition to the default bibliographic style (the ANSI standard), APA, MLA, and Science Magazine formats are readily available. Virtually any other format can easily be generated by creating a customized punctuation file. Data entry is straightforward, with flexible screen editing and a copy-to-index capability that saves on retyping.

Biblio-Link utilities are being written that will make reformatting of downloaded citations a snap. Possible applications of the program include creating a microcomputer-based catalog for a specialized library, compiling bibliographies for inclusion in journal articles or class syllabi, or preparing publication-ready catalogs that can be illustrated using MacPaint.

Personal Bibliographic Software, Inc., P.O. Box 4250, Ann Arbor, MI 48106; (313) 996-1580.

Word Processing Checklist **A+ MAGAZINE** **Nov. 85** **p.35**





Tips and Techniques

This section of ***Wheels for the Mind*** contains hints, tips, and techniques gathered from software authors, vendors, users, publications, user groups, and just about anywhere else. If you have tips to share, please send them along to the editor: Peter Olivieri, Computer Sciences, Boston College, Fulton 430, Chestnut Hill, MA 02167.

MACPAINT

Many thanks to MacPaint author Bill Atkinson, who provided these great MacPaint tips.

CONSTRAINING IS A GREAT TOOL. When you use the Shift key in conjunction with some of the tools in MacPaint, the results can be quite impressive.

Shift - Using this while in FatBits will help you fill in straight lines, both vertically and horizontally. I'll bet everyone has tried it freehand at one time or another with little success.

Shift - This allows you to erase areas without "wandering" into other areas of your drawing that you want to leave untouched.

Shift - This gives some great effects. Try using the "fence" brush shape with Shift key and you'll get some nice borders.

Shift - This can be used to move the screen up and down (or left and right) without straying from your intended course. This also works quite nicely in Show Page mode.

Shift - This makes perfect squares.

Shift - This makes perfect circles.

FAST FATBITS. If you have selected, hold down the ⌘ key and click your cursor at the spot where you want FatBits to be displayed. This is an amazingly fast way to get in and out of FatBits. It is much better than double-clicking or using the menu to do this.

MULTICOPY. Holding down the ⌘ and Option keys while dragging creates some interesting features. They are best explained with a demonstration, so please sit down at a Macintosh and try these.

DOTTED LINES AND CIRCLES. Select a line width that is fairly large. Select a brush shape that is a dot (not too big a dot). Use the tool to place a dot on the screen. the dot. Use the multicopy technique to draw a dotted line. Try making a dotted circle.

Shift with the multicopy technique does some neat constraining. Try this: Draw a rectangle with a decent-size border. Suppose the rectangle is not quite long enough. Use the ⬚ icon to select the right half of it; use Shift with multicopy to stretch the rectangle to the right. Better yet, try this: Fill in the rectangle with a "noisy" pattern of your choice. If you now try the Shift multicopy technique (preceding), the pattern will not "stretch" correctly. Do not despair. Go to the Goodies menu and select Grid. Now try the Shift multicopy method, and the pattern will copy as well. Try this, you'll like it! Bill Atkinson calls this technique the "three-finger stretch."

UNDO is much easier if you use the upper left key on the keyboard. That's right, it works just like the menu item for Undo but lets you react faster.

TRANSPARENT PAINT is a neat effect. Try the following. Paint several stripes on the screen. Paint another color across them. Notice that the last stripe painted is opaque. Now hold down the ⌘ while painting another stripe . . . you get transparent paint. If you select the filled-in ▭ tool, you can even draw a background "behind" what is on the screen. This technique also allows you to paint near curved or straight lines without spilling over onto the line itself. (You've all done that!) Try these...you'll be impressed.

PATTERN GRABBING. Let's suppose that a friend gives you a disk that has some neat patterns on it that you'd like to have. You really don't want to go to the trouble of editing a pattern in detail. Try this: Paint the pattern of interest onto the screen somewhere. Double-click on a pattern in the pattern palette that you won't mind replacing. When the "pattern edit" box appears, move to your document and just click somewhere on the pattern you like. That's it. It's yours.

TYPING TEXT. Sometimes when you're in text mode you would like to change styles (perhaps do something in bold). However, when you click the mouse to change styles and then click again to start typing, you often can't easily line up the typing so it looks continuous. If you press Enter instead of clicking, all your typing will be on a straight line.

SAVING MACPAINT SPACE. If you have a lot of MacPaint pictures, you may be using a lot
of space on your disk. If some of your "drawings" are not a full page, you can get some of your space back. The technique is to "combine" some of your pictures. If you get two pictures on a single document, you will save about 2K per document. It adds up!

MACPAINT 1.4 BUG. When using MacPaint Version 1.4 on a Macintosh 512K, you can crash the application with a system error if you use Show Page after opening an old document. You can get around this problem by opening MacPaint from the desktop and then using the "Open" command to get at the document of interest.

QUICK EXIT. Lots of current users are leaving MacPaint the fast way: Hold down the ⌘ key while choosing Quit from the file menu. The disk ejects, the tone sounds, and the Macintosh reboots. However, you really shouldn't use this method, as it doesn't guarantee that your disk directory will be in perfect order.

Double-Click on any pattern and you can edit/create your own pattern.

Double-Click on the ☜ icon and the full page is displayed.

MOVING OBJECTS . If you use the icon to move and copy objects, the "white background" that follows when you use the icon stays behind. This is especially useful when overlaying one picture onto another. In effect, the captures only the object that is selected.

PLACING OBJECTS ON TOP OF OTHER OBJECTS. If you wish to make an item transparent (say the lenses in a pair of eyeglasses), leave a little break in the frames where the lenses are. Using the icon will allow you to capture only the "borders" of the frames and allow the final object to look like real eyeglasses (that is, you can "see" through them). Try this to get the full effect. If you wish, you can then use FatBits to "repair" the breaks in the frame.

MAKING AN EXACT COPY OF AN OBJECT. After you select an object with the icon or the icon, you can make an exact copy by holding down the ø key, pointing to your object (make sure an arrow appears), pressing down the mouse button, and then dragging to a new location. Letting up on the button places your copy on the page. You can continue making as many copies as you wish.

MAKING MULTIPLE COPIES OF AN OBJECT. You can make repeating copies (a nice effect) by selecting an object with the icon or the icon, holding down both the Option key and the ⌘ key, pointing at the object until an arrow appears, and then dragging the mouse while holding the button down. Interesting note: The current line width determines how much space will be between repeating copies as you do the dragging. Try some different line widths to get a feel for this.

STRETCHING AN OBJECT. Select the object, using the icon. Hold down the ⌘ key and point to one of the edges of the enclosed figure. When an arrow appears, hold down the mouse button, drag the enclosed area left or right (maybe up or down), and watch your object stretch!

ENLARGING AN OBJECT. When you paste an object onto the screen, it returns in the same size that it was cut (or copied). You can cause it to return as a larger or smaller image than the original. Before you paste, use the icon to place a border rectangle on the screen. Make the size of this rectangle equal to the size you would like your object to be. When you now use the Paste option, your object gets resized accordingly.

CHANGING FONTS AND TEXT SIZE. Sometimes it's awkward to use the mouse and menu system for changing font styles or type sizes. If you hold down the ⌘ key and the Shift key, and then press >, you will automatically call the next font. Each time you press > you will call another font. To try different text sizes, just hold down the ⌘ key while you press >. After trying this for a bit, you may prefer to use this technique all the time.

AUTOMATIC MACPAINT DOCUMENT. If you hold down the ⌘ key and the Shift key and then press 3, the current screen will be saved as a MacPaint document called SCREEN0. (You can save 10 such "paintings.") That drawing is now available to you in MacPaint. This allows for some very creative applications.

NO BORDERS. If you select the dotted line from the border palette, your filled rectangles and circles will have no outline.

HIDDEN FEATURE. Select a drawing with the ≈ icon and hold down the Shift key. Select Trace Edges from the Edit menu and your drawing will now have a shadow.

CUSTOM PATTERNS. If you create a MacPaint document that contains several boxes with various patterns that you designed, you can easily call them up while drawing and transfer them to your pattern menu at the bottom of the page. Just use Cut and Paste to transfer a pattern from your MacPaint pattern collection to the pattern you wish to edit.

TRANSPARENT PAINT. You can paint with transparent paint. Hold down the ⌘ key and use the , , or .

CATALOGS. In the Goodies menu, there is a Print Catalog selection. Using this command, you can get a one-inch-square "picture" of all of the MacPaint pictures on your disk. It makes a handyreference.

MACTERMINAL

The following keystroke combinations may be of interest to users of MacTerminal:

- ⌘ H Backspaces cursor one space
- ⌘ I Moves cursor to right to next Tab
- ⌘ J Moves cursor down one line
- ⌘ K Moves cursor down two lines
- ⌘ M Moves cursor back to start of line
- ⌘ G Causes tone to sound

MACWRITE

CHARACTER ACCENTS. To use an accent, umlaut, and other characters in conjunction with letters, do the following: First press the key combination that produces the special character (look at Key Caps to see what combination is required), then type the letter you want in that same position. The ^ and the ` work only with the lower-case vowels. The ´ also works with E. The ~ can be used with a, o, n, and N. The ¨ works with lower-case vowels and upper-case A, O, and U.

IMAGEWRITER SWITCHES can control your printer in a variety of ways. There are two sets of switches on the ImageWriter. The first set, called SW1, controls some of the features of draft -mode printing. SW2, the second set, has switches that can cause irregularities in your printing if they are not properly set. If you want to use a foreign language set for draft printing, you can change the switches marked 1, 2, and 3. The settings for different character sets can be found in your ImageWriter user's manual (page 44). The pitch can also be modified with switches 6 and 7 (see page 41).

SW2 has three switches that will affect printing in any resolution if not correctly set. Switches 1 and 2 control the baud rate. MacWrite and Multiplan both need 9600 baud (both switches closed—see page 39). Switch 3 controls the XOn/XOff protocol. If the setting is not correct, you will get a dialog box that says "Printer Is Not Responding."

DOUBLE LINES can be created in MacWrite by choosing Underline from the Style menu and then typing with the underscore character (SHIFT -). To get the "double line" under words, you must enter a double line for a few spaces, then begin typing your words, and then end with your double lines again. This feature does not work on the LaserWriter printer yet.

MACWRITE DOCUMENT SIZE. A MacWrite document on a Macintosh 128K is limited to about 27,000 characters. This is nearly 5,000 words, or 20 double-spaced pages, in 12-point type. If you use a lot of fancy fonts and graphics in your paper, you won't be able to have as many pages. With a Macintosh 512K, you can have about 80 double-spaced pages (roughly 20,000 words).

QUICK ERASING. To erase some text, select it in the usual way and press the Backspace key. It's gone! You may prefer to use Cut or Copy if the text will be used again. Another alternative is to select the text and begin typing the new material. The new material will automatically replace all of what you selected.

SAVE SOME MACWRITE SPACE. On your MacWrite disk, put the Sample Memo in the Trash (saves 3K). Even more space can be saved if you remove fonts that you really never expect to use. This can easily be done by using the Font Mover application. Be careful not to remove any of the System Fonts.

SAVE MORE MACWRITE SPACE. If you save your documents without special fonts, rulers, and pictures, you can save up to 30 percent of the space consumed by that document. Thus, until you're ready for final copy, you might consider saving your documents using Text Only. This is one of the options in the Print dialog box.

SAVE PAPER. When you get the dialog box for printing, fill in the requests for beginning and ending page numbers. The last page will not be ejected from the printer, and no blank pages will be printed.

REPLACING DELETED LETTERS. Ever use the Backspace key to erase letters and wish you had them back? Try using the ⌘ key together with the Backspace key and the letters will return. (The cursor will even move forward.)

SAVE SELECTION TIME. To select large areas of a document, click at the starting point, use the scroll box to find the end point for the selection, hold down the Shift key, and click again. The whole area is selected. This is called Shift-clicking and is not known by many MacWrite users.

FAST WORDS. Select an entire word by doing a Double-Click on it.

WIDER PAGES. You can have a right margin that extends past the 7 1/4-inch mark. Grab the title bar of your document and move the window a few inches to the left. Then use the size box to make the window wider on the right side. You can then extend the right margin marker.

HOW BIG IT IS. Sometimes you might want to know how much memory you have left for your MacWrite document. If you are in MacWrite, you can choose the "About MacWrite" selection from the Apple menu. You will be shown the amount of memory left for your current work.

UNABLE TO CREATE A NEW DOCUMENT. MacWrite 4.5 requires at least 11K on the application disk to create a new document; otherwise, a dialog box stating "The disk to too full to create a new document" is displayed. You may, however, open previously created documents.

Before you create a new MacWrite document, free up space on the application disk if you need to by moving documents stored on that disk onto other disks. Additional storage room may be obtained by removing excess fonts and desktop tools.

Here is a technique enabling you to open "new" documents when little room exists on the startup disk:

1. Free up room on your MacWrite disk.
2. Create and save a totally blank document onto a disk, preferably onto your data disk.
3. Whenever you need a "new" document, open your empty "template," then save it immediately under another name.

MISCELLANEOUS HINTS

A telephone extension cord may NOT be used as a substitute for the keyboard cord on your Macintosh.

WARNING. Do not place an external speaker too close to your disk drive. Its magnetic field may cause problems with your data on disk. This is particularly important as users begin to attach speakers for such applications as MusicWorks and SmoothTalker.

DON'T ASK. If you're in the habit of swapping disks a lot and there are a number of disk icons on your desktop, you can save yourself some time. After you have ejected a disk that you think you won't use for awhile, put the disk icon in the Trash. The Macintosh will forget about its presence and not bother asking you for it.

MULTIPLE DESK ITEMS. You can have multiple Note Pads (or Scrapbooks) available on your disk. Simply rename the Note Pad "Note Pad #2" (or some other meaningful name). The system will then create a new Note Pad and only look at that Note Pad file. You can rename any of your other Note Pads to that name and look at them whenever you wish. Be careful when renaming, think through what you're trying to accomplish. Also, multiple Note Pads will take up disk space, so don't plan on keeping too many of them.

WATCH THAT BATTERY. The battery in your Macintosh does more than just run the clock. It helps maintain 20 bytes (characters) of information about which ports are used for your printer and modem. If your battery is running low, your printer may stop working. If this happens, just exit the application, turn off the Macintosh, and take out the battery. The Macintosh then uses regular current to get the required information. Eventually, of course, you will want to replace your battery.

RESOURCE FONTS. It's not necessary to store fonts in the System File. They can be installed as the resource font of an application or application document. Once installed as a document resource, such a font can be used by someone who doesn't have that particular font in their System Folder.

CHANGING STARTUP DISKS. An easy way to change startup disks while you're in the midst of your work is to hold down ⌘ and Option at the same time and double-click on the Finder icon of interest. The disk with that Finder icon will now be identified by the Macintosh as the startup disk. (It will appear in the upper right corner of the desktop.)

SPACE RACE. Never work with less than 20K of free space on a disk. If you try to print a MacWrite document with less space, you may ruin the document. You will probably need a good deal more free space for your MacPaint creations. It would be a good idea to begin to have "storage disks" for finished work, and "working disks" for daily creations.

PRINT A WINDOW. You can get an instant copy of the active window by holding down the ⌘ key and the Shift key and pressing the number 4.

PRINT A SCREEN. You can get an instant copy of the current screen by pressing the Caps Lock key. Then hold down the ⌘ key and the Shift key, and press the number 4.

DON'T REJECT EJECT. You should always use the Eject option to remove your disks from the internal and/or external drive. Other methods may result in a loss of your disk directory or files. Better safe than sorry.

BACK UP A BIT. Always, always make a backup copy of disks that are important to you. With the Macintosh, this is a very easy process. Either use the application called Disk Copy or drag the icon of the original disk on top of the icon of the one to be used as a backup. Be advised: Using the Disk Copy application is faster if you have only one disk drive. (Treat yourself! Buy a second disk drive as soon as possible.)

EASY PRINTING. You can print your documents or pictures directly from the desktop. (1) Select the item (or items) that you want printed. (2) Choose the Print option from the File menu. (3) Select the appropriate settings (they'll be the same if you have chosen to print several documents).

SAVE ENTRY TIME. Pressing the Enter key is the same as clicking OK in a dialog box.

EJECTING. Eject disks by holding down the ⌘ key and pressing E . If you have two disk drives, arrange the desktop so that the two disk icons appear. Type ⌘ A (selects all icons). Then type ⌘ E (ejects all disks).

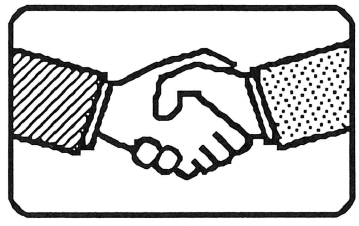
DISK DIRECTORY. You can get a printed copy of your disk directory by clicking on the Icon to get the window of contents. Select by name from the View menu. Now print the active window by holding down the ⌘ key and the Shift key and pressing 4.

MOVING WINDOWS. If you hold down the ⌘ key before you drag a window somewhere, you can drag it without making that window active.

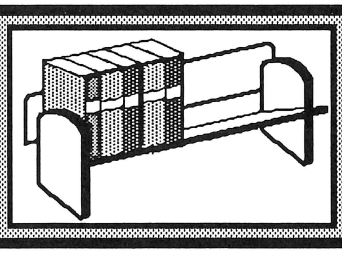
CALCULATOR CALCULATIONS. Cut and paste a number (or a series of arithmetic operations) to the calculator and watch it work automatically. You can also use the keyboard to operate the calculator.

FIXING CRASHED DISKS. If you have a disk that is no longer working, try the following. Hold down the Option key and the ⌘ key while booting that disk.

Share your ideas hints, tips, and techniques with others.



Send them to us at **WHEELS FOR THE MIND.**



Resources

Publications

A+ Magazine
Ziff-Davis Publishing Company
One Park Avenue
New York, NY 10016

Icon Concepts—The MACazine
113 East Tyler Street
Athens, TX 75751

Mac News—Guidebook to Products
110 Baldwin Street
Fall River, MA 02720

MacTech (for Programmers)
P.O. Box 846
Placentia, CA 92670
David Smith; (714) 993-9939

Macworld
Subscription Department
P.O. Box 20300
Bergenfield, NJ 07621

Editorial (Macworld)
555 DeHaro Street
San Francisco, CA 94107

Semaphore Signal
207 Granada Drive
Aptos, CA 95003

The Macintosh Connection Newsletter
Hi-Tek Publications
P.O. Box 99
North Salem, NH 03073

MacUser
The Macintosh Resource
29 Haviland Street
Norwalk, CT 06854

nibble MAC
45 Winthrop Street
Concord, MA 01742-9990

Popular Computing
P.O. Box 388
Martinsville, NJ 08836-9964

Macintosh Books

Pascal on Macintosh Learned Through Games
Author: Peter Bock
Audience: High School
Available: Not known
Publisher: Computer Science Press

Pascal on the Macintosh
Author: Dr. Lowell Carmony
Audience: High School
Available: Not known
Publisher: Computer Science Press

Macintosh Pascal
Author: Steve Charnicoff
Audience: General
Available: Not known
Publisher: Hayden

Scientific Programming with Macintosh Pascal
Author: Richard E. Crandall
and Marianne M. Colgrove, Reed College,
Department of Physics
Audience: College
Available: March 1986
Publisher: Wiley

Macintosh Apple
Author: Casey Green, USLA, Higher
Education
Research Institute
Audience: General
Available: Summer 1984
Publisher: Dilithium Press

Macintosh Pascal: A Hands-On Approach
Author: Ted Lewis, Oregon State University
Audience: College
Available: March 1985
Publisher: dilithium Press

Programming the Macintosh in Assembly Language
Author: Steve Williams
Audience: College
Available: Now
Publisher: D.C. Heath

The Macintosh Toolbox
Author: Thomas A. Blackadar
Audience: College
Available: Not known
Publisher: D.C. Heath

The Easy Guide to Your Macintosh
Author: Joseph Caggiano
Publisher: Sybex Books

Using & Programming the Macintosh
Author: Frederick Holtz
Publisher: Tab Books, Inc.

MacWork MacPlay
Author: Lon Poole
Publisher: Microsoft Press

The Apple Macintosh Book
Author: Cary Lu
Publisher: Microsoft Press

Macintosh for College Students
Author: Brian Pfaffenberger
Pub: Sybex Books

The Macintosh
Author: Bill O'Brien
Publisher: Bantam Books: New York

Introducing the Macintosh
Author: Duff
Publisher: McGraw-Hill

Introduction to Macintosh Basic
Author: Kamins
Publisher: Apple Press

Presentation Graphics on the Mac
Author: Lambert
Publisher: Microsoft Press

Multiplan Made Easy, Mac Edition
Author: Ettlin
Publisher: Osborne

Using MacWrite and MacPaint
Author: Field
Publisher: Osborne

Microsoft Word Made Easy/Mac Edition
Author: Hoffman
Publisher: Osborne

Introducing the Apple Macintosh
Author: Connoly/Lieberman
Publisher: SAMS

Macintosh User's Guide
Author: McComb
Publisher: SAMS

JAZZ on the Macintosh
Author: Caggiano & McCarthy
Publisher: Sybex Books

Mac Graphics for the Macintosh
Author: Grillo & Robertson
Publisher: CBS Computer Books

Mastering Your Macintosh
Author: Skyvington
Publisher: Prentice Hall International

Macintosh Revealed: Vol. 1 Unlocking the Toolbox
Author: Chernicoff
Publisher: Apple Press (Hayden)

Macintosh Revealed: Vol. 2 Programming the Toolbox
Author: Chernicoff
Publisher: Apple Press (Hayden)

Basic Microsoft BASIC for the Macintosh
Author: Coan & Coan
Publisher: Hayden Macintosh Library

Inside MacPaint
Author: Young
Publisher: Microsoft Press

The Macintosh BASIC Handbook
Author: Blackadar & Kamin
Publisher: Sybex Books

Macintosh Program Factory
(BASIC)
Author: George Stewart
Publisher: Osborne McGraw-Hill

Programming in Microsoft BASIC
Author: David A. Kater
Publisher: Osborne McGraw-Hill

Macintosh Game Animation
(BASIC)
Author: Ron Person
Publisher: Osborne McGraw-Hill

Macintosh Programming Techniques
(BASIC)
Author: David C. Willen
Publisher: Howard W. Sams, Co.
A Division of Macmillan

Microsoft Macinations
Introduction to Microsoft BASIC
Publisher: The Waite Group

PASCAL Primer for the Macintosh
Author: Dan Shafer
Publisher: The Waite Group

Games and Utilities for the Macintosh
(PASCAL)
Author: Dan Shafer
Publisher: The Waite Group

Hidden Powers of the Macintosh
(PASCAL)
Author: Christopher Morgan
Publisher: The Waite Group

Mastering the Macintosh Toolbox
Author : David B. Peatroy
Publisher : McGraw-Hill

Using the Macintosh Toolbox with C
Author : Takatsuka et al
Publisher : Sybex

Macintosh Midnight Madness
(Utilities & Games in BASIC)
Author : The Waite Group
Publisher : Microsoft Press

Assembly Language Primer for the Macintosh
Author : Keith Matthews
Publisher : The Waite Group

The Complete Macintosh Sourcebook

Authors: Doug Clapp and Pat Ryall
Publisher: InfoBooks
P.O. Box 1018
Santa Monica, CA 90406
(213) 470-6786

Suggested retail price: $24.95.

The *Complete Macintosh Sourcebook* is a guide to more than 750 Macintosh products.

The 400-page sourcebook contains descriptions of Macintosh software, hardware, books, magazines, and programming languages—an extravaganza of Macintosh information.

The sourcebook describes software in the following categories: business, special-interest, integrated software, word processing, communications, graphics, sound and animation, personal finance, education, data bases, games, desk accessories, and utilities.

Individual chapters are devoted to public- domain software, printers, hard disks, networking hardware and software, peripherals, accessories, and "souped-up Macs." A section titled "Becoming a Macintosh Developer" details the software development process.

Appendices include information on user groups, telecommunications services, and a list of manufacturers cross-referenced by address, phone, and product. The sourcebook also contains a listing of Macintosh public-domain software available from CompuServe.

Articles of Interest

McPIC (Pictures)
INFOWORLD
8/13/84 P. 61

MacPaint (Drawing/Art)
MACWORLD
Apr. 84
POP. COMPUTING
Nov. 84 P. 90

MacDraw Scaled Drawing
MACWORLD
Sept. 84 P. 51
MACWORLD
Nov. 84 P. 115

Elements of Graphic Design
MACWORLD
Feb. 85 P. 122

A MacCopy Program
A+ MAGAZINE
Oct. 84 P. 131

Mac Criticisms
A+ MAGAZINE
Oct. 84 P. 141

The Mac Makes Music
A+ MAGAZINE
Aug. 84

Should Students Buy a Computer?
POP. COMPUTING
Oct. 84 P. 115

A Look at Micros on Campus
POP. COMPUTING
Oct. 84 P. 118

The 512K Macintosh
MACWORLD
Nov. 84 P. 56

Behind the Finder
MACWORLD
Nov. 84 P. 135

Playing Games on the Mac
POP. COMPUTING
Dec. 84 P. 29

Macintosh Software
PER. COMPUTING
Dec. 84 P. 110

Future of the Micro
POP. COMPUTING
Jan. 85 P. 89

Products from Reed College
BYTE
Jan. 85 P. 415

Penny-Wise Programs
Public Domain Software
A+ MAGAZINE
Jul. 85 P. 101
Aug. 85 P. 123

A look at the New Finder
A+ MAGAZINE
Jul. 85 P. 131

Business Simulation Games
INFOWORLD
Jul. 8, 85 P. 38

The Resource Editor
MACWORLD
Jul. 85 P. 131

The Writer's Tool Chest
MACWORLD
Jul. 85 P. 46

A Look at Switcher
MACAZINE
Jun. 85 P. 93

Macs in Schools
MACAZINE
Jun. 85 P. 27

Choosing a Hard Disk
MACUSER
Nov. 85 P. 43

Repairing Damaged Disks
MACWORLD
Nov. 85 P. 107

Fine Art of Data Transfer
Popular Computing
Sept. 85 P. 69

Laser Printers
A+ Magazine
Nov. 85 P. 57

MAC Software Trends
INFOWORLD
Aug. 12, 85 P. 32

Macintosh Books
A+ Magazine
Dec. 85 P. 153

Travelling with MAC
Nibble
Nov. 85 P. 77

Natural Languages
Popular Computing
Sep. 85 P. 64

New Apple Products
A+ Magazine
Nov. 85 P. 19

Software for Managers
Popular Computing
Sep. 85 P. 22

Speeding Up the Mac
MACUSER
Nov. 85 P. 67

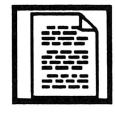
QuickDraw Part III
Nibble
Sep. 85 P. 64

UNIX for the Macintosh
A+ Magazine
Dec. 85 P. 187

X/L Serve
MACUSER
Nov. 85 P. 37

The LaserWriter and Printing
MACUSER
Jan. 86 P. 69

Macintosh Development Languages
MACUSER
Jan. 86 P. 120



Project Reports

This section of **Wheels for the Mind** presents many of the projects that are being developed at various colleges and universities. The listings are not restricted to Consortium schools nor to schools in this country. You will find projects that are being done at universities all over the world.

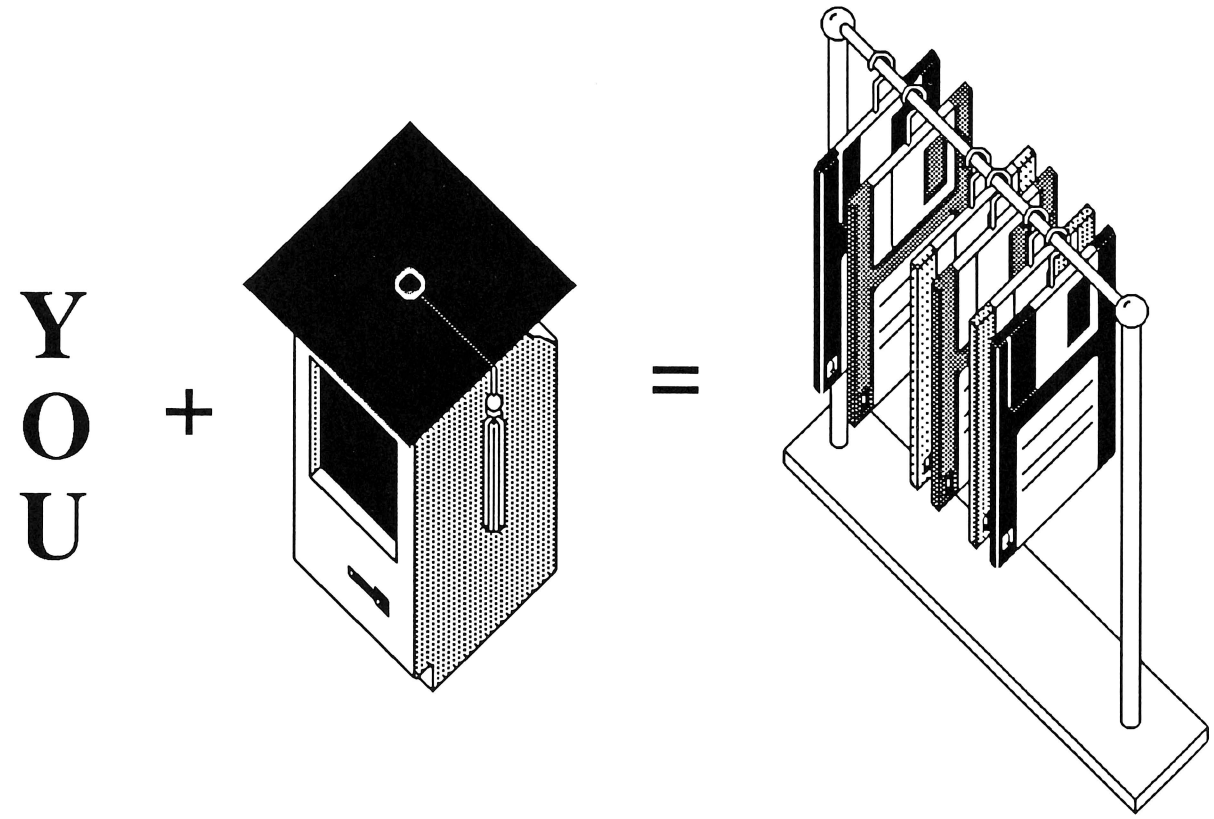
Some of the items listed here are just in the beginning stages while others are completed and ready for distribution.

Wherever possible, we have tried to list an appropriate contact in case you are interested in finding out more about a particular listing.

One of the original intents of organizing educational institutions around the Macintosh was to provide opportunities for creative people to share their expertise and talents. We are sure that you will find much of that creativity in evidence here.

Please feel free to join with another in developing a application, develop one on your own, or simply use one that was developed by one of your colleagues.

Most importantly, let us know what YOU are working on. Perhaps there are others across the world that might like to be working with you ! Send us a description of your project.



Project: Instrument Panel

Robert Loewenstein of Yerkes Observatory is developing a remote control "instrument panel" for use with a new 3.5-meter telescope to be built in New Mexico. The panel will allow a user to connect to the observatory through a satellite link, switch on one of seven instruments, open the dome, position the telescope, and receive data. Thus, the observer will have real-time feedback on the quality of the data as well as control over the telescope from anywhere a satellite link can be established. The physical instruments that the Macintosh will collect data from are two types of infrared-detector arrays. One is a 32-channel spatial array that is displayed in two kinds of strip charts. The other is a linear array of 32 channels that handles spectral data; the data is displayed as a graph of the raw spectrum. The prototype version of the program consists of five windows: three data and two control. It was written on a Macintosh 512K in a beta release of Kriya Systems' Neon.

Current status: Unknown.

Project: Spaceflight Instrument Data Collection

The Laboratory for Astrophysics and Space Research is using a Lisa to perform bench tests, accelerator calibration, and eventually, data collection from spaceflight instruments that measure cosmic rays. The instruments consist of an array of silicon detectors, which are reverse-biased diodes that produce a pulse when ionizing radiation passes through them. This work is being done by James Beatty and others under the direction of John Simpson.

Current status: Unknown.

Astronomy

William Sterner,
Lead Staff Analyst,
Information
Technologies and
New Services
Computation Center,
University of
Chicago,
5737 University Ave.
Chicago, IL
60637;
(312) 962-7172
STAFF.BILL
@UCHICAGO

Project: Botanical Classification

A plant identification program to enable students to identify any one of 90 different shrubs and trees in the local environment. (Existing data base is specific to flora of the Drexel University campus.)

Current status: Completed.

Project: Identifying Biological Specimens

AUTOKEY is an interactive system (written in Absoft's FORTRAN) that is designed to provide quick and accurate identifications of biological specimens for people with little direct experience in biological identification. The identification scheme is based on a data matrix rather than the linear character sequence of traditional taxonomic keys. This results in a multipath approach that avoids uncertain character evaluations, permits specimen characters to be missing, and allows for the use of nontraditional characters such as

Biology

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street,
Philadelphia, PA

Dr. Ron Hellenthal,
Dept. of Biology,
University of
Notre Dame,
Notre Dame, IN
46556;

Biology

behavior, geographical distribution, and color. Data sets for the identification of approximately 100 groups of organisms (mostly aquatic insects) have been developed.

Current status: Unknown.

Project: Evaluation of Natural Habitats

ERAPT is an interactive information retrieval and analysis system that permits the evaluation of natural habitats and organism assemblages using stored information on the environmental requirements and pollution tolerances of biological species. The system displays the collective requirements of any group of species, predicts the species likely to occur under any set of environmental conditions, and evaluates groups of species for incompatibilities in environmental requirements that should preclude their coexistence under a single set of environmental conditions. The system is designed for the screening and quality assurance of environmental information and as a tool for environmental managers. The development of this system is being sponsored by a grant from the U.S. Environmental Protection Agency Corvallis Environmental Research Laboratory. Presently, ERAPT data bases contain 48,413 environmental data values from 402 genera and 1,689 species of aquatic organisms from several distinct groups.

Current status: A prototype version of this system is currently working on a Macintosh 512K. A full implementation of the system on the Macintosh XL is planned.

Project: Labtutor

Dr. Ron Hellenthal,
Dept. of Biology,
University of
Notre Dame,
Notre Dame, IN
46556;

Labtutor (Lisa Pascal) is a package that uses its own command interpreter to process procedure files into interactive laboratory tutorials that present complicated analytical procedures as simple step-by-step instruction sets. The system can automatically check and evaluate intermediate and final results for errors and incompatibilities. An initial set of procedure files is being developed for the chemical analysis of drinking water.

Current status: This system is still in an early development phase and is not expected to be completed until late 1987.

Project: DNA Analysis

**Craig McGowan
Computer Center
University of
Rochester
727 Elmwood Avenue
Rochester, NY 14620**

The Cornell DNA analysis package available on Apple II and IBM PC computers is being adapted to the Macintosh. This package allows the user to perform various types of pattern-matching analyses on strings of DNA and RNA.

Current status: Under development.

Project: Heat Exchange in Animals

This program consists of instructional and interactive material on the physical laws governing heat transfer and the thermoregulatory strategies adopted by animals.

Current status: **Near completion.**

Professor Craig Heller
Department of
Biological Sciences
Stanford University
Stanford, CA 94305

Chemistry

Project: Molecular Editor/Compiler

A software-based molecular-model construction kit. Molecules or crystal structures of up to 99 atoms can be displayed in a three-dimensional ball-and-stick representation and rotated about any of three axes. Position coordinates for each atom and bond connective are entered in two tables. The resulting displayed structure can be edited directly on the screen. Users can store and retrieve structures as files, compare up to nine structures by rapid sequential display, change the displayed size of the molecule, measure and display bond lengths and bond angles, and combine two subunits (skeleton and functional group) to form a new molecule. Package includes the editor itself and a number of basic molecular and crystal structures.

Current status: Completed.

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd and
Chestnut Street,
Philadelphia, PA

Project: Prelabs

A series of programs that enable students to test their understanding of concepts and procedures that they will be using in their experiments. Designed to clear up misunderstandings before experiments are begun. Written with Drexel's Lesson-Writer authoring tool.

Current status: Unknown.

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd and
Chestnut Street,
Philadelphia, PA

Project: Orbital Mixing

Orbital Mixing depicts the molecular orbitals derived from the 1p orbitals overlapping the PI manner. All orbitals are viewed perpendicular to the 2p nodal plane. The radii of the circles shown are proportional to the atomic orbital coefficients, and the areas of the circles are thus proportional to electron density.

Current status: Orbital Mixing is finished and is now being used in intermediate-level chemistry courses.

The Personal
Computing Center,
1 McNutt Hall,
Dartmouth College,
Hanover, NH 03755;
(603) 646-3249.

Project: Controller for Laboratory Equipment

A data-acquisition program for the EMM-2048 or Universal Microcontroller. This program sets up the communication protocol necessary to access digitized data collected from laboratory experiments. Current status: Unknown.

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street
Philadelphia, PA

Chemistry

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street
Philadelphia, PA

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street
Philadelphia, PA

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street
Philadelphia, PA

David Baka, Bill Howell,
UW - Madison,
619 N. Lake Street
Madison

Dr. Maurice E. Schwartz,
Department of Chemistry,
University of Notre Dame,
Notre Dame, IN;
(219) 239-7744

Project: Polymerizations

Simulates chemical reactions that occur in the polymerization process. Specifically designed to graphically show the difference between step- and chaingrowth polymerizations.

Current status: Unknown.

Project: R/S

Illustrates the Cahn-Ingold-Prelog stereochemical designation system: presents the correct designation procedure for molecules with one chiral center, using static text and four interactive examples, and presents nine interactive problems of increasing complexity. The last two problems have the chiral center located on a ring. Includes a subroutine demonstrating appropriate molecular rotations, the capability of handling molecules with zero and two chiral centers, stereochemical designations for alkenes, and simple stereochemical operations.

Current status: Completed.

Project: Peri-Chart

A data base of atoms and elements that uses the periodic chart as a control structure. User can obtain data for such properties as isotopic masses and abundances, electronegativities, oxidation states, and valence electron configurations. Tabulation and plotting capabilities are features. User can learn by exploring or by using gamelike practice activities within the program. Can also serve as a "chemical calculator" by supplying molecular weights when formulas are given. Since the data are easily edited, it should also be useful to advanced students and professional scientists.

Current status: Completed.

Project: Biochemistry of the Cell

This application shows how cell organelles work together to produce and store biochemicals needed to maintain life. Complete with full documentation and charts of metabolism.

Current status: To be completed by August 1986.

Project: Chemical Curve Fitting

Uses a general, linear, least-squares program on the Macintosh/Lisa in courses ranging from first-year undergraduate survey to graduate laboratory technique. Written in Absoft's FORTRAN, the programs are specially designed for chemical applications, providing for extensive error checking, the ability to correct/eliminate data and to reanalyze given data many times, and more. An important feature is the multitude of transformations provided, which allow "raw" data to

be converted to new forms important in chemistry (for example, logarithmic, inverse, and exponential). Future extensions will include provision for graphic display and higher polynomial fits.

Current status: Unknown.

Project: Quantum Chemistry

(1) Particle in one-dimensional box with finite wall.
(2) Simple Huckel molecular orbital.
(3) Ab initio self-consistent field molecular orbital plus configuration interaction.
These are all being cleaned up for easy access by the novice user.

Current status: Used (1) in freshman honors chemistry, (2) with junior physical chemistry students, and (3) with seniors and graduate students. (Absoft's FORTRAN)

Project: Periodic Table Tool

The Periodic Table Tool will contain a data base of approximately 10 commonly used elemental attributes (such as electronegativity, ionization energy, atomic weight, and oxidation state), which can be manipulated by the tool. Any pair of attributes of a selected set of elements will be plotted on an X-Y graph. Elements whose attributes are to be displayed can be chosen from a displayed periodic table by cursor manipulation. (Microsoft BASIC 2.0)

Current status: Expected completion May 1986.

Project: Multiplan Spreadsheets

EquilCalc provides a tool for solving equilibrium concentrations in the general reaction aA+bB=rR+sS, given initial concentrations and the equilibrium constant. AcidBaseTitr generates a plot (within Multiplan) of pH vs. added base for the titration of a weak acid with a strong base; no approximations as to the magnitude of Ka or [H+] are made in deriving the equation used in AcidBaseTitr. Molmass is a simple molecular weight and percent composition calculator.

Current status: Completed.

Project: KSIMS

A simulation in chemical kinetics. Time-dependent concentrations of a chemical reaction are computed after initial concentrations of reactants and temperature are specified. Data can be tabulated and plotted in order to deduce the balanced reaction, the rate law for the reaction, and a value for the rate constant. For use in general and physical chemistry.

Current status: Completed.

Chemistry

Dr. Maurice E. Schwartz,
Department of Chemistry,
University of Notre Dame,
Notre Dame, IN;
(219) 239-7744

Jim Johnson,
Asst. to Chairman,
Department of
Chemistry,
247 Neiuland,
Science Hall,
University of
Notre Dame
Notre Dame, IN:
(219) 239-5659

Special Projects
Coordinator,
Microcomputing
Program, Drexel
University, 32nd
and Chestnut
Street
Philadelphia, PA

Chemistry

Dr. Russ Larsen
Department of Chemistry
Texas Tech University
Lubbock, TX 79409
(806) 742-3057

Project: Vistas in Chemistry (MacVIC)

A package of programs is under development for use within the chemistry lecture hall. The goal is to develop highly visual, animated graphics that illustrate chemical and physical phenomena; the programs are intended for the first-year courses.

Current status: Probable completion by summer 1986.

Roy Roberts
Chemistry, College of Natural Sciences
University of Texas
Austin, TX 78712

Project: Organic Molecular Structures

This project will explore the feasibility of using the Macintosh to generate complex organic molecular structure to aid in teaching organic chemistry. Planned applications vary from simple production of overhead projections to dynamic, graphic representations of chemical reactions.

Current status: Completed.

Marianne Colgrove
Education and Documentation Coordinator
Development Lab
Reed College
Portland, OR 97202
(503) 771-1112, ext. 277

Project : BenchTop Application: NMR Spectroscopy

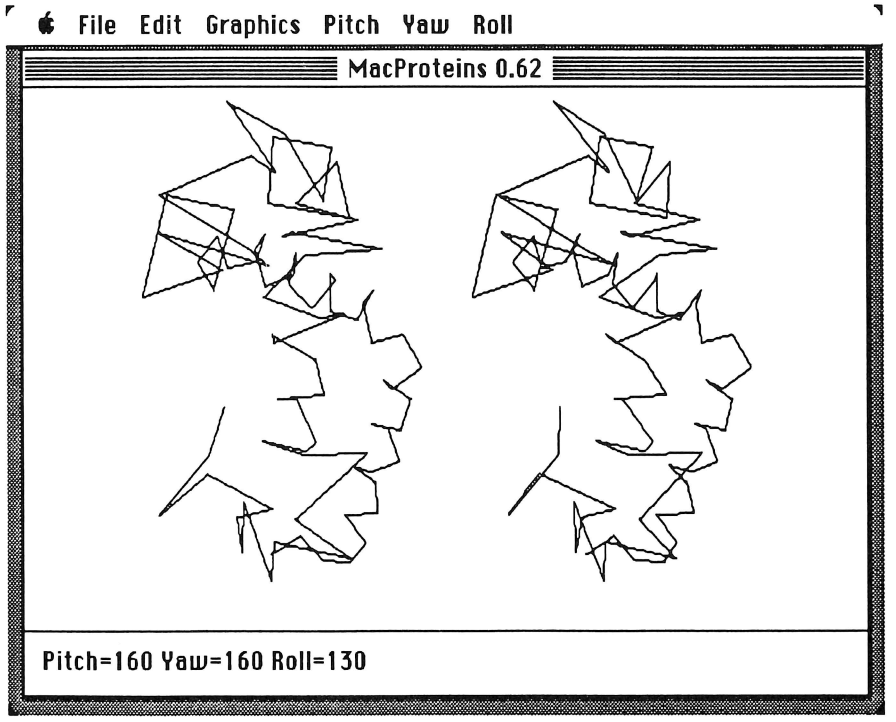
NMRSystem, developed by Adam Whiting, a chemistry senior at Reed College, allows a Macintosh to run, display, and store NMR spectra from a Varian EM-360 NMR Spectrometer. The system consists of a Macintosh, linked to a specially modified BenchTop Instrument that is, in turn, linked via RS-232 connectors to the oscilloscope input/output of the spectrometer. The BenchTop Instrument is customized with a 12-bit D/A circuit that sends a +10V to -10V voltage ramp into the spectrometer and a 12-bit A/D circuit that takes in the analog voltages from the instrument and converts them to digital values. The whole process of recording the spectra is controlled through a Rascal program, which automatically downloads a 40-byte assembly-language program to the BenchTop Instrument and then allows the user to obtain spectra while controlling a number of instrumental parameters, including calibration, the time of the scan, the width of the scan, and the integration of all peaks. Spectra can be printed immediately or stored as MacPaint documents. Future improvements will allow for the time-averaging of several spectra and an interface with a VAX mainframe computer in order to carry out large-scale theoretical analyses of spectra.

Current status: Completed.

Project: 3D Protein Structures

This program utilizes the x-ray crystallographic coordinates of a protein to generate 3D images of the protein's structure. The actual picture drawn is based on a series of simple commands like TRACE, BACKBONE, and SIDECHAIN to specific the portion of the structure to be shown on the screen. The image can be viewed either in mono mode or as a stereo pair. The portion of the structure displayed on the screen can be rotated about the x,y and z axes individually or simultaneously.

Current Status: To be completed by the summer of 1986.



Chemistry

Evan R. Kantrowitz
Department of Chemistry
Boston College
Chestnut Hill, MA
02167

Project: An Assembly-Language Shell

The "Supervisor" provides an assembly-language environment in which the programmer can concentrate on programming with the 68000 assembly language, without worrying about input and output or even about the fact that the programming takes place on a Macintosh. The package is basically a collection of input/output macros and subroutines, and includes a nonsymbolic debugger and complete documentation. [It was described in more detail in Issue #2 of *Wheels for the Mind* in March 1985.] The disk includes 16 sample assembly-language programs; with a good textbook or academic course, they constitute an introduction to 68000 assembly language. The software has been used successfully and extensively in several

Computer Science

Professor Jerry Keough
Department of Mathematics
Boston College
Chestnut Hill, MA
02167

Computer Science

assembly-language courses at BC, as well as at many other universities. To obtain the software, please send a request (on official academic stationery), a blank disk, and a SASE with sufficient return postage.

Current status : Completed.

Australian Computer Science Projects

Project: Micro-Based Board for AppleTalk-to-UNIX ACSnet Link

Dr. Mike J. Rees, Information Science, University of Tasmania

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Project: Macintosh Electronic Blackboard

Dr. Mike J. Rees, Information Science, University of Tasmania

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Project: Digitizing Software for the Macintosh

Department of Information Science, University of Tasmania

Project: MacShell—Sophisticated Terminal to UNIX

Steve Coy, Computer Science, University of Western Australia

Project: MacProlog—Ported from PDP11 UNIX

Steve Coy, Computer Science, University of Western Australia

Project: Compiler/Interpreter for Pascal-S

Neil Gray, Computing Science, University of Wollongong

Project: Distributed Programming

Neil Gray, Computing Science, University of Wollongong

Project: Small Laboratory Computer Simulation

Neil Gray, Computing Science, University of Wollongong

Computer Science

Project: MacEngine

Cut-down Macintosh for use in such applications as sharing printers, print spooling, and providing a network gateway.

Neil Gray and Gary Kelly, Computing Science, University of Wollongong.

Current status: All projects are continuing.

Project: Rascal

The final release of Rascal is finally available! Rascal (as mentioned in previous issues of *Wheels for the Mind*) is a new language-and-development system designed for the Macintosh, incorporating Editor, Linker, Compiler, and Execution Environment in a single application. Rascal is based on Pascal, with numerous C influences, and incorporates Macintosh concepts directly into the language. Rascal provides built-in millisecond timing routines, and allows production of stand-alone applications and desk accessories, easy serial port access, and uniform disk/keyboard/screen/serial IO calls. In addition to total library support of *Inside Macintosh* routines and definitions, an extensive collection of specialty libraries includes turnkey menus, sound, windows, editor, 3D graphics, and printing support. Macintalk and AppleTalk libraries are also provided.

Many new features are available in the final release of Rascal. Completely rewritten documentation includes a new primer, user manual, language definition manual, and library listings (also included on disk). Intelligent linking is also provided, as is new code optimization that puts Rascal execution speed on par with Macintosh C compilers. Rascal now provides scripting capabilities, which allow conditional compilation of more than one file at a time, as well as many new Editor, Compiler, and Execution options (including support for use of both Modem and Printer ports as bi-directional serial ports).

Current status: Totally complete!

Rascal is commercially available, for $129 (discounts for educational users), from:

Metaresearch, Inc.
1100 SE Woodward
Portland, OR 97202
(503) 232-1712

Technical contacts:
Scott Gillespie or
Richard Crandall
Reed College
Portland, OR 97202
(503) 771-1112, ext. 277

Computer Science

Prof. Richard Crandall,
Reed College,
Portland, OR 97202

Project: Assembler/Editor/Loader

This application was designed to allow efficient programming of Intel 8051/8031/8751 microcontrollers. Using the Macintosh window environment, this package provides instant visual access to all steps of program development: editing the source code in the Edit window; assembling the source code into hex opcode, which is then visible in the Assembler Listing window; and downloading the object code and using the Monitor window to send commands that execute the code. It is ideal for programming serially networked MCS-51-based devices or for high-speed data collection and appliance control via external lab computers.

Current status: Completed. Price: $150.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Pascal Pointers

A tutorial-type package for teaching the use of dynamic variables and pointers in Pascal. The user is able to type in commands from a suitable subset of Pascal. These commands are interpreted and the resulting data structure is displayed (and updated) graphically on the screen.

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: LR1 Gen

A Parser/Generator. This program accepts an input grammar and generates LR-Parse tables from the grammar. Options: LR, LALR, Strong Compatible LR, Weak Compatible. LR-Parse tables in human-readable and machine-readable forms.

Current status: Completed.

Maria Code,
Data Processing Services,
1371 Sydney Drive,
Sunnyvale, CA 94087;
(408) 735-8006

Project: UNIX-Based C-Development System

SUMacC is the Stanford/UNIX Macintosh C-development environment, a collection of programs that allows you to cross-develop Macintosh applications on your UNIX system and then download them to the Macintosh for execution. Included with the package are Macintosh library/header/lint files, UNIX commands (such as rmaker, macget/put, mac-to-laserprinter), examples, and documentation. Source files are provided. Requires VAX Berkeley UNIX or Eunice. A tape containing the SUMacC files is available for $65 plus shipping. Contact Maria Code, Data Processing Services, for additional details.

Current status: Version 2 completed.

Asst. Chairman,
Undergrad. Education,
Stanford University;
(415) 497-2300

Project: Using Pascal in Introductory Programming

The computer science department has already added a Macintosh section to its CS1 "Using Computers" course.

Current status: Ongoing.

Computer Science

James Gips,
Computer Science,
Boston College;
(617) 552-3975

For your information only. No contact available.

Project: Using the Macintosh in a First Computer Course

The Macintosh has been successfully used as the primary learning tool in a first computer course for about 400 students. Course materials include examples on Multiplan, Microsoft Chart, Microsoft BASIC, Filevision, MacWrite, and MacPaint.

Current status: Completed and continuing.

Project: Portable Standard LISP (PSL)

PSL for the Macintosh is another in a series of the University of Utah standard LISPS. Currently, it allows up to 45,000 objects on a Macintosh 512K. This will soon be a fully developed commercial product, priced at around $500.

Current status : Completed.

Project: MacGnome

MacGnome is a Macintosh environment for teaching beginning programming. It is based on a structured programming language designed particularly for the course. It guides the novice through program development by presenting options from which the student can choose, showing necessary parameters needed for built-in subroutine calls, detecting errors in syntax, and providing extensive on-line help facilities.

For your information only. No contact available.

Project: MacProlog

An implementation of Prolog for the Macintosh ported from a PDP11 UNIX version. Version 1 is a straight port with a single, unsizable window. Version 2 will have multiple windows and control menus. Version 1 is available to consortium members free of charge. Send us a disk.

Current status: V1 is completed and V2 will be ready in early 1986.

**Casper A. Boon and Damian P. Meyer
Department of Computer Science,
University of Western Australia,
Stirling Highway
Nedlands 6009
Western Australia
(09) 380-2282**

Project: Binary Trees

Binary Trees is used in computer science courses to allow students to experiment interactively with the concept of binary trees.

Binary trees can be used as an alphabetically sorted list or as a "parse tree" for arithmetical expressions. At any time, a tree may be traversed in-order, post-order, or pre-order. Parsing of infix, postfix, and prefix expressions is likewise permitted.

Current status: Now in Version 2.1.

**The Personal Computing Center
1 McNutt Hall
Dartmouth College
Hanover, NH 03755**

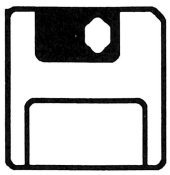
Computer Science

Project: Event Tutor

Event Tutor helps Macintosh programmers learn about "events" (see *Inside Macintosh*, "The Event Manager").

Each time an event is received by the program, the Macintosh beeps and shows in the menu bar the event name, the window involved, and a bullet if it is a "System event" (not to be handled by the programmer).

Current status: Version 1.1 available



Design

Mike Barlow or Karen Lee,
IRIS, Cypress Hall,
Stanford University,
Stanford, CA 94305

Rich Marisa
University of
Rochester
727 Elmwood Avenue
Rochester, NY 14620

Kate MacGregor,
Cornell University

Project: 3D Geometry

Mechanical engineering Professor Douglass Wilde's program allows manipulation of computer-generated pictures as part of instruction in three-dimensional computer-aided design.

Current status: To be completed in winter 1985/86.

Project: PADL 1—Computer-Aided Design

PADL 1 is a solid-modeling program currently running on VAX computers. Capabilities include hidden line graphs from object specification and difference, union, and intersection of arbitrary objects.

Current status: Under development.

Project : Perspective Drawing Recognition.

A program is being developed for the School of Design and Environmental Analysis. It is a teaching program for recognizing correct perspective drawing. It consists of a series of exercises, designed to be interesting and helpful, to be used solely as a learning tool (no recording of answers or percent correct).

Current status: Expected to be completed in April 1986.

Economics

Special Project
Coordinator,
Microcomputing
Program,
Drexel University,
32nd and Chestnut
Street,
Philadelphia, PA

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd and
Chestnut Street,
Philadelphia, PA

Project: Review Units for Economics I

Ten units cover various aspects of supply-and-demand analysis. Random generation of numbers provides unique problems for each use. Response feedback provided. Student receives scoring information that can be printed out for presentation to the instructor.

Current status: Completed.

Project: Classroom Demos

A set of 30 homework problems for Economics I and II has been developed. They cover topics ranging from profit maximization to international trade.

Current status: Completed.

Economics

Special Project Coordinator,
Microcomputing Program,
Drexel University, 32nd and
Chestnut Street,
Philadelphia, PA

Problem Sets for Introductory Economics

Covers topics ranging from supply and demand to international trade. Students receive problem sheets for which instructor assigns random values (within set parameters) for all variables. Professor has disk that generates answers for problems using variables with any of the values allowed within the set parameters. Requires Multiplan.

Current status: Completed.

Special Project
Coordinator,
Microcomputing
Program,
Drexel University,
32nd and
Chestnut Street,
Philadelphia, PA

Project: Problems in Macro- and Microeconomics

A five-disk set that includes microeconomics (introduction, cost functions, demand, competitive models, wages—pure competition, wages—imperfect competition, wages—monopsony, and wages—union), macroeconomics (money and banking, international exchange and trade, economic objectives, income determination, and fiscal policy), and an economic data base. Requires Multiplan and MacWrite.

Current status: Completed.

Education

Prof. Michael
Scriven, Education,
University of
Western Australia
Stirling Highway
Nedlands 6009
Western Australia

Project: MacSED—Software-Evaluation Data Base for Macintosh

Prof. Michael Scriven, Education, University of Western Australia

Current status: To be completed in February 1986.

Project: Mentor

This project will use Odesta Helix, and possibly other software, to provide a question-answering, CAL, and testing data base for teachers.

Current status: To be completed in November 1986.

Education

Ranadeva Peries
Department of
Computer Science
University of Western
Australia
Stirling Highway
Nedlands 6009
Western Australia

Project: An Examination-Answering Program

This application is being developed for use by first-year computer science students; it will be part of an automatic examination-generation, answering, and marking system. The application will enable students to use the Macintosh to answer examination questions generated automatically. Using the keyboard and the mouse, students will be able to type in answers to questions, edit them, if necessary (using an "Answer" window), and get information about the questions answered (using an "Info" window).

Current status: Completed.

Project: Child's Math Practice Games

Dr. I. Robertson, Geology, Australian National University

Current status: Ongoing.

Project: Multiple-Choice Test Scoring Program

Brian Anderson, RUUE, University of Western Australia

Current status: Unknown.

Project: Game Tests for Children

Monique McGuire
Department of
Computer Science
University of Western
Australia
Stirling Highway
Nedlands 6009
Western Australia

This application contains a series of very simple games, written so the child does not get beaten as quickly as in other computer games. The games will be meaningful to the children as well as providing monitoring times for instructors.

Current status: Unknown.

Project: The Show and Tell Language

The Show and Tell Language (STL) is a new visual programming language designed for schoolchildren and novice computer users. Its goal is to facilitate keyboard-less programming as the first step toward programming in MacPaint. An acyclic data-flow graph functions as the basic syntactic structure of the language.

Education

Don Kimura, Ph.D.
Dept. of Computer Science
Washington University
509 Bryan Hall
St. Louis, MO 63130

The capabilities of the current version include:

- **Image data values (MacPaint file through Clipboard pasting)**
- **Text speech (through SmoothTalker driver)**
- **Relational data query**
- **Standard arithmetic operations**
- **Serial and parallel iteration**
- **Recursion**
- **Multitasking (quantum = 1/30 second)**

The following capabilities are being tested:

- **"Picture phone" (simultaneous drawing on two Macintosh screens) through AppleTalk**
- **Electronic mailing on AppleTalk**

Current status: Continuing.

Project: MatchMaker

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

This application is an authoring tool that enables the user to create matching exercises for drill and practice or testing. The user develops text in MacWrite and then, using this utility, creates a matching-type stand-alone application for student use. The student indicates an answer by moving the selected word or phrase onto the line beside the question it matches. There are 10 items per unit, grouped in three-unit segments. A two-line help message can be included for each item. Any character that can be typed in MacWrite and then saved as text can be included in the application.

Current status: Unknown.

Project: Academic Transcripts/Field Surveys

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

The National Opinion Research Center (NORC) has completed one—and is developing another—Computer-Assisted Data Entry (CADE) program for use in entering academic transcripts and field surveys. The transcript project is part of NORC's National Longitudinal and High School and Beyond Survey sponsored by the National Center for Education Statistics. These programs were written in the Lisa cross-development environment by William Mudge, to increase data integrity and lower acquisition time. The transcript program runs on the Macintosh 128K and utilizes only keyboard commands in order to optimize coding speed.

Current status: Unknown.

Project: Faculty Developer's Agreement

The University of Chicago Computation Center released a standard "Developer's Agreement" for faculty, staff, and students early in 1985. This agreement provides the official framework for technical and administrative support of Macintosh software development on campus for the nominal
fee of $150 per year. Developers have access to our technical liaison, a developers' user group, reference library, user and developer bulletin boards, and on-campus previews of Macintosh High School. The Computation Center makes no ownership or copyright claims to developed software, yet individuals may be affected by the specific terms of their relationship to the university.

People interested in additional information should contact one of the university's Apple contacts at Computation Center, University of Chicago, 5737 University Ave., Chicago, IL 60637; (312) 962-7151, or via Bit Net: @UCHICAGO.

Current status: Completed.

Project: Computer-Aided Learning of Euclidean Geometry

A. Koerbin, Information Science, University of Tasmania

Current status: Unknown.

Project: Multiple-Choice Examination System

Department of Information Science, University of Tasmania

Current Status: Unknown.

Project: Interactive Teaching Package

Department of Information Science, University of Tasmania

Current status: Unknown.

Education

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Education

Prof. Thomas A. Standish
Computer Science Dept.
University of California
Irvine, California
92717

Project: SmallGol Animated Educational Compiler

SmallGol is an educational compiler which compiles a small educational language. Controls can be set and windows can be positioned to view both the isolated actions and the interactions of the lexical analyzer, the syntax analyzer, and the code generator. An accompanying manual explains how SmallGol works and provides a listing of the Lisa Pascal code for the SmallGol compiler. A Macintosh diskette is available containing the *SmallGol* compiler, a *MiniAda* compiler, and a tiny text editor named *SmallEdit.*

Current Status: Completed. Price $25. (California residents add 6% state tax)

Finished products are distributed by:
Andromeda
3018 Mountain View Drive
Laguna Beach, CA 92651

Engineering

Dr. Douglas R. Mason
Department of Geology
The University of Newcastle
Ranklin Drive
Shortland, New South Wales 2308, Australia
(049) 685229

Project: Magmatic Crystal Fractionation

Magmatic crystal fractionation processes will be modeled, using a program written in BASIC and the unique graphic capabilities of the Macintosh. Input will include starting magma composition, composition and amounts of crystallizing minerals, and the number of crystallization steps. Output will include crystal cumulate and residual liquid compositions, and selected x-y plots of particular chemical variables. The interactive character of the program will permit its use in class labs.

Current status: Unknown.

Project: Determinate and Indeterminate Structures

Analyzes simple determinate and indeterminate structures. Students can use this software to conduct parametric studies of the effect of relative stiffness, boundary conditions, and geometry on structure response.

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Igneous Rock Identification

Uses basic properties of igneous rocks (mineralogy, color, texture, and so on) to assist in the identification of common igneous rocks. Properties determined in the laboratory are used as input.

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Sedimentary Rock Identification

Employs basic properties of sedimentary rocks (mineralogy, grain size, fossils, and so on) to assist in the identification of common sedimentary rocks. Properties determined in the laboratory serve as input.

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Engineering

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Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Metamorphic Rock Identification

Employs basic properties of metamorphic rocks (mineralogy, texture, and so on) to assist in the identification of common metamorphic rocks. Properties determined in the laboratory serve as input.

Current status: Completed.

Project: Earthquake Engineering

Reviews and defines basic principles of earthquake seismology through text and graphic displays. A short review of selected applications of seismology is included.

Current status: Completed.

Project: Structural Geology

Reviews basic principles of structural geology and applies those principles to the interpretation of geologic maps.

Current status: Probable completion in December 1985.

Project: Groundwater Hydrology

Reviews and defines basic principles of groundwater hydrology and geology (including steady-rate well hydraulics).

Current status: Probable completion in December 1985.

Project: Material Balances

TK!Solver templates and Macintosh Pascal programs for use in teaching material balances.

Current status: Completed.

Project: Electromagnetics

Developed to aid classroom instruction of various aspects of electromagnetic field theory through the production of visual aids and exercises.

Current status: Completion expected in June 1986.

Engineering

Project: TK!Solver for Problems in Materials Science and Engineering

Includes rapid crack propagation in plastic pipes, prediction of phase diagrams, determination of purity of materials, polymer flow and processing, and impact behavior of materials. All important behavior of materials properties (thermophysical, mechanical, electrical, chemical, and so on) is covered.

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: SISO

An application for the study of linear dynamic systems and linear control theory. Includes simulations, designs, and graphic output. System is designed and analyzed in both time and frequency domains.

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Fourier Analysis

Follows the same user-interaction format and screen-design philosophy as the Signal Operations module for undergraduate courses in systems engineering. It performs discrete Fourier Transform of signals using the Fast Fourier Transform (FFT) algorithm and allows a variety of signal operations in both the time and frequency domains. Signal-windowing capability is provided, including a number of commonly used windows as well as user-defined windows. The program is designed as an interactive analyzer to test and reinforce transform concepts with minimal tutorial function.

Current status: Unknown.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Interactive Analysis Programs

Civil engineering application used to analyze simple, determinate, and indeterminate structures. Students can use this software to conduct parametric study of the effect of relative stiffness, boundary conditions, and geometry on structural response.

Current status: Unknown.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Mechanical Engineering

This application will provide dynamic system simulation and control system design. Integrates equations of motion and computes eigenvalues and eigenvectors, frequency response, and root locus plots.

Current status: Probable completion in January 1986.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Engineering

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street,Philadelphia, PA

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Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Geotechnical Engineering I

A civil engineering application that provides laboratory reduction programs (consolidation, triaxial shear, and so forth) and related graphics.

Current status: Unknown.

Project: Geotechnical Engineering II

This project includes geotechnical engineering analysis programs (consolidation settlements, slope stability, pile analysis, and others) and related graphics.

Current status: Unknown.

Project: Mineral Identification

Employs a decision-tree type of approach to assist in the identification of 48 common minerals. Physical properties (hardness, color, cleavage, and so on) are determined by laboratory methods and used as input. Program identifies by elimination or suggests several of the most likely identities.

Current status: Completed.

Project: Mineral Analysis

This Pascal program assists students in identifying the 30 most common minerals found in rocks, soils, and important ore deposits. Procedure involves laboratory determination (by the student) of several basic physical properties, such as luster, cleavage, crystal symmetry, hardness, streak or color, and acid reaction. The properties are then entered into the program, and the computer suggests the most likely mineral or minerals that exhibit the properties described.

Current status: Completed.

Project: Structural Analysis

Dialog programs for structural analysis to help students strengthen their background in basic principles of structural mechanics, including stability, determinacy, and equilibrium. The programs are interactive, with graphics to display the type of structure, geometry, and loading.

Current status: Unknown.

Project: Structural Response to Loading

Interactive programs to determine structural response to loading. For a given structure the student is asked to determine maximum internal forces (shear forces and moments) and maximum deflection for a particular loading. This type of program can be used to conduct parametric studies of the effect of different parameters on structural response.

Current status: Unknown.

Project: Simulation Design

Professor Jucker of the Department of Industrial Engineering has designed graphical exercises for analyzing random-number generators. The students practice fitting the generated data with probability distributions and forecasting models.

Project: Chemical Engineering Process Principles

This is a software tutorial that reviews the elementary process principles in flowing processes, using examples suitable for freshmen. Two such examples are mass balances in flowing separators and heat transfer in two stream heat exchangers. Uses Multiplan.

Current status: Completed.

Project: Sulfuric Acid Manufacture

A software tutorial to review principles in this three-reaction step process (using examples suitable for freshmen). The reaction steps in the contact process are the simple burner for dioxide, the complex multistaged catalytic bed for trioxide, and the unusual absorber reactors for acid and oleum. Uses Multiplan.

Current status: Completed.

Project: Signal Operation

A Signal Operations module for use in introductory systems engineering courses. Intended as a visualization tool for signal and system processing, it offers a variety of signal-generation options ranging from singularity functions, sinusoids, and exponentials to arbitrary functions. It also provides signal editing capability. Signal operations include time and amplitude scaling, time shifts and flips, addition/subtraction, multiplication/division, difference, summation, and convolution. Except for minimal "help" capability, the module has no tutorial function. It is designed as an interactive exerciser which carries out lengthy and routine computations and displays the results in graphical and/or numerical form.

Current status: Completed.

Engineering

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Mike Barlow or Karen Lee, IRIS, Cypress Hall, Stanford University, Stanford, CA 94305

Mike Barlow or Karen Lee, IRIS, Cypress Hall, Stanford University, Stanford, CA 94305

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Engineering

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Deformation and Fracture of Materials

Professor Miller of Materials Science is developing a program to model deformation and fracturing of materials under a variety of conditions.

Current status: Unknown.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Materials Engineering

Implementation of TK!Solver for problems in materials engineering, such as rapid crack propagation in plastic pipes, prediction of phase diagrams, determination of purity of materials, polymer flow and processing, and impact behavior of materials.

Current status: Completed.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Statics

Computer-aided learning packages for STATICS. Also, a computer-aided design engineering (CADE) approach which uses a Smart Sketch pad to enable the engineer (student) to use the Macintosh in the same way he or she would use pencil and paper in a design solution.

Current status: Probable completion in January 1986.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Mechanics

Use of the Macintosh to produce orthographic, isometric, oblique, and section drawings; plots of graphs; and equation analysis of curves. The use of Macintosh Pascal is being explored for producing a piping drawing.

Current status: Unknown.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Systems Analysis

An interactive, menu-driven software package that uses MS BASIC for systems analysis. Students will be able to use this as an aid to solving problems in which matrix manipulations are involved. The following routines to be made into interactive packages with illustrative examples are included: 1) finding roots of a set of nonlinear equations using the Newton-Raphson method; 2) ordinary differential equation solver along with some graphic routines in order to animate time response of dynamical systems; and 3) finite element techniques.

Current status: Completed.

Engineering

Project: Thermal-Fluid Instructional Software

Thermal-fluid instructional software has been developed (on a VAX 11/750 computer using FORTRAN). This has been done with a view to implementing the microcomputer as a useful tool in the instruction of basic heat-transfer and fluid-mechanics courses at the undergraduate level in the mechanical engineering and mechanics department. The programs are interactive and allow students to perform parametric studies of the topics discussed in class.

Current status: Unknown.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Bode Design

The Bode technique for designing a feedback control system essentially involves manipulating Bode magnitude and phase plots until the system specifications are met. A program has been written in Macintosh Pascal that allows the user to interactively change the exact magnitude plot, viewed on the screen, by changing the poles and zeros of the function being plotted.

Current status: We are in the process of adding the phase plot to the program, going to a compiled version, and improving the user interface.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Introduction to the Thermosciences

The Ranking Cycle session is a tutorial written for Engineering 32, Introduction to the Thermosciences by Professor Robert Eustis. It is to be used as the prime instructional medium for the topic, replacing a lecture. The courseware will be one of about a dozen such tutorials. The lesson is made up of two types of screen presentations. In the first type, an instructional frame, the content material is presented with illustrations. The student can scroll text to read the new material. The tutorial also uses interactive frames. In these, the student is given a problem and attempts to solve it by generating graphs and data for different thermodynamic systems.

Current status: Unknown.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Stereographic Projection Methods

Dr. Kosel developed the stereographic projection program for the study of crystalline structure to accompany and illustrate techniques developed in a paper entitled "Computational techniques for stereographic projection," published in the *Journal of Materials Science* 19 (1984). The paper describes a number of operations that may be performed on any crystal system, including the plotting of any pole or direction on a projection of any orientation and the drawing of the great circle of the plan which is normal to this plane or direction. (Microsoft BASIC)

Current status: Completed.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Engineering

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Model Builder for Simple Systems

Model Builder is a tool for rapid development of mathematical models of physical systems. The program allows user specification of a variety of parameters to be used in the simulation (independent/dependent variables, additional constants and supplemental equations), which must be representable by a set of differential equations. The generator program creates an appropriate BASIC program using data that the user enters through dialog boxes, then executes. Up to three simultaneous graphs of the system's performance can be shown during integration. (Microsoft BASIC 2.0)

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Water Microbiology and Organic Pollutants

Professor Grbic'-Galic' (Department of Civil Engineering) has devised a set of assignments that examines two processes: the growth of microorganisms and the degradation of organic compounds. The student manipulates relevant parameters and views the result in graph form.

Current status: Unknown.

Mike Barlow or
Karen Lee, IRIS,
Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Rankine & Brayton Cycles

Professor Eustis has designed instructional material and simulations to teach the principles involved in the Rankine and Brayton cycles.

T. J. Wagner
Department of
Electrical and
Computer Engineering
University of Texas
Austin, TX 78712

Project: Bode Analysis Program

This program provides a magnitude and phase plot for a linear system with a rational transfer function. The poles and zeros of the transfer function are input graphically. The gain constant of the system, as well as the frequency and magnitude scales of the two plots, can be selected for the particular function being plotted. Manipulation of the pole-zero plot, which is done in a way that is natural to the Macintosh user, produces new magnitude and phase plots quickly. This program should be used in any situation in which traditional Bode Analysis is used. It should also be useful as a demonstration program in an undergraduate course.

Current status: **Completed.**

Engineering

C.H. Roth
Department of
Electrical and
Computer Engineering
University of Texas
Austin, TX 78712

Project: Transmission Line Simulation

This program shows voltages and currents on a transmission line with real source and load impedances. This type of input, the length of the line, the attenuation, and the value of the source and load impedance may all be selected. Because a rich variety of examples can be generated by this program, it should be ideal as a demonstration program for a student studying transmission lines for the first time.

Current status: Completed.

Project: Wave Guide Lab

John Lefor
Electrical Engineering
University of
Rochester
727 Elmwood Avenue
Rochester, NY 14620

The Mac488 interface was used to interface a multimeter to the Macintosh. Microsoft BASIC 2.0 was used to control the experiment and graphically display the data acquired.

Current status: Unknown.

Project: Aerodynamics

George Dulikravich
Aerospace Engineering,
College of Engineering
University of Texas
Austin, TX 78712

This project will try to demonstrate that most computer programs in the computational fluid dynamics area can be successfully implemented on a Macintosh with two 400K disks, 512K RAM, and hard-copy computer graphics capability. Undergraduate students will develop aerodynamics and gas dynamics computer codes and test run them on the Macintosh, then transfer them to either HARRIS, VAX, IBM, or CYBER mainframe computers for time-consuming runs.

Current status: Completed.

Project: Desktop Laboratory

Eugene Wissler
Chemical Engineering,
College of Engineering
University of Texas
Austin, TX 78712

This program incorporates Macintosh systems for initial use in the course Computer Applications in Chemical Engineering, and will form the nucleus of a considerably larger number of applications in other chemical engineering courses. The systems are installed in a desktop laboratory environment and use Macintosh FORTRAN by Absoft. This lab establishes relatively inexpensive workstations for students, creating an environment similiar to the ones they are likely to encounter after graduation.

Current status: Completed.

Engineering

Terry Wagner
Electrical Engineering,
College of Engineering
University of Texas
Austin, TX 78712

Project: Graphics Course

A revised curriculum for a junior-level computer graphics course in the electrical and computer engineering department will be designed to incorporate the unique graphics capabilities of the Macintosh. Macintosh Pascal and callable QuickDraw subroutines in ROM will form the core of the course. This combination provides rapid graphics generation and facilitates example and assignment production. A set of course notes describing the principles of the course will be developed.

Current status: To be completed soon.

Project: Boston College Font Project

This intermediate release between 3 (August 1985) and 4 (January 1986) is being provided to answer an unexpectedly heavy demand for our fonts.

Here is what you get on the disks:

FOLDER [SEL Fonts]
In Font file "SEL Cyrillic":

200 Pskov 10/20, version 2.5 or later. Proportional. Seattle/Geneva-based full Cyrillic font set for Russian, Ukrainian, Byelorussian, Old Russian, Old Church Slavonic, Bulgarian, and Serbian, as well as some non-Slavic languages of the Soviet Union. Central keyboard mapping corresponds to Russian typewriter. (M.J. Connolly)

202 Vladimir 12, version 1.8 or later. Proportional. Chicago-based Cyrillic font set for modern Russian only. Same keyboard mapping as Pskov. (M.J. Connolly)

204 Lunt 10/12. Proportional. Hybrid font set with Pskov 10 (lower ASCII only) and Vladimir 12 mapped on a QWERTY (U.S. keyboard) basis, corresponding to the Russian Smith-Corona keyboard designed by Horace G. Lunt and sometimes used by American Russian departments. (L.G. Jones / MJC)

In Font file "Hayeren":

205 Eznik 10/20, version 2.25 or later. Proportional. Seattle/Geneva-based Armenian font, including some dialect characters and ligatures. Central keyboard mapping corresponds to the Olympia and IBM arrangements. (M.J. Connolly)

208 Mesrob 12, version 1.8 or later. Proportional. Chicago-based Armenian font, including some dialect characters and ligatures. Central keyboard mapping corresponds to the Olympia and IBM arrangements. (M.J. Connolly)

In Font file "Library": —NEW—

209 Library 10/20, version 2.62. Monospaced. Monaco-based font for typing in basically any Western language using a Roman alphabet (including languages such as Icelandic, Early Germanic, Welsh, Maltese, Turkish, Hungarian, Czech, Polish, Croatian, Slovenian, and others that are not covered by the regular Macintosh extended ASCII set), and also for standard scholarly transliteration of many others (for example, Slavic languages, Armenian, Sanskrit, Avestan, and Hebrew, to name the ones we work with most). The set includes some text-editing symbols for philological work. Nonspacing (dead) keys (prestrike) include upper case

Fonts

Prof M.J. Connolly
Dept. of Slavic and Eastern Languages
Boston College / Carney 236
Chestnut Hill MA 02167
(617) 552-3912

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and lower case; grave, acute, tilde, umlaut/dieresis, circumflex, ring, high dot, hachek/caron, macron, breve, double grave (Croatian), and double acute (Hungarian). Nonspacing subscripts include çedilla, low dot, and ogonek (Polish). Special letters include all those from the Macintosh extended set and wyn, yogh, thorn, edh, long s, barred L/l (Polish), undotted lower-case i (Turkish), dotted upper-case I (Turkish), barred H (Maltese), barred h (Croatian), barred d (Croatian), the jers (Slavic), hw digraph (Gothic), theta, and angma (English phonemics, Avestan). (M.J. Connolly)

In Font file "Tech":
203 Tech 9/10/12/14/18/20/24. Proportional.
Geneva- and Reed Math-based font for mathematical and technical formulæ and expressions, designed especially for use in econometrics papers. (D. Belsley)

In Font file "Unifon": —NEW—
206 UnifonM 9/12, version 1.5. Monospaced.
Monaco-based font designed for the bi-lingual American Indian projects at the Center for Cultural Development, Humboldt State University, Arcata, California. CCD uses the Unifon alphabet for Hupa, Yurok, Karuk, and Tolowa as well as for a phonemic English. (M.J. Connolly)

In Font file "ASCII":
211 ASCII 12. Monospaced.
Special font for typing the ASCII slot number corresponding to a given key or key-combination. (By Larry Shepley, via Walter W. Knapp's Font Workshop disk)

In Font file "SELGk": —NEW—
212 Saloníki 10/20, version 3.2 or later. Proportional (lower-case vowels monospaced).
A 'true Greek' font using dead keys for accents, breathing, and diacritics. Complete for classical and modern Greek, including inscriptional and dialect characters.

FOLDER [System]
The System file contains the April 1985 upgraded Apple system and the standard desk accessories, except that the standard Key Caps has been replaced by an experimental one that allows the user to see particular fonts mounted in the System file.

The Finder is Version 4.1, the latest official Apple release.

The ImageWriter driver is Version 2.0 for ImageWriter I and II.

Fonts

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FOLDER [Tools]
The Font Mover is the old, reliable utility of Apple's official April 1984 system upgrade package. The newer Font/Desk Accessory Mover does not always clean out the System file correctly and has a few other annoying bugs.

The powerful (but dangerous) Resource Mover is included here as a convenience for those who wish to change font IDs or names. Unless you know the quirks of this undocumented utility, do *not* experiment without first backing up your work.

FOLDER [Templates]
Kb512 is a MacDraw document (for 512K Macintoshes only) that contains a dynamic keyboard template that can be easily altered to provide documentation for a font that is in the System file under which MacDraw is running.
1) Select the four keyboard diagrams, then choose from the Font menu the font you wish to document, and the keys should fill in with the appropriate symbols.
2) Select the key combinations matrix, choose Ungroup from the Arrange menu, select the 5 x 15 matrix itself (this will deselect the caption rows and columns), and choose the font from the Font menu again. Available combinations will fill in. Marquee select and group the entire matrix, with captions.
3) Select the description headers at the upper right corners and change as desired.
4) Print.
5) Do *not* Save the altered matrix. Either Quit (which will cause the matrix to revert to the original version) or use Save As... (which will give you a second, new, template with your font on it, for example, kb Pskov).

In fonts that have dead keys, you will have to go into the keyboards (Ungroup), select the key in question, type the appropriate key followed by a space (even better an <option>-space), thicken the box to indicate a dead key, and Group the keyboard again.

The kb128/1 through kb128/3 files have the same objects broken up over three files, since a Macintosh 128K cannot handle the number of objects in the full document.

The file seq templ is a Microsoft Word document, which has the characters typed out in ASCII sequence. By selecting the entire document and changing the font selection, a user can get a quick overview of which characters are occupying which ASCII slots. (To see which ASCII slots map to which keys, make a MacDraw template documentation of the font called ASCII.)

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HARDCOPY DOCUMENTATION:

- This covers document. The file Release 3 Notes contains a text-only version that can be opened from inside any Macintosh editor or word-processing package (such as MacWrite or Microsoft Word).
- Pskov 10 keyboard chart (2pages).
- Eznik 10 keyboard chart (2pages).
- Library 10 keyboard chart (2pages). Dead keys (prestrike) highlighted.
- Saloniki 10 keyboard chart (2pages). Dead keys (prestrike and poststrike) highlighted.

FUTURES:

Fonts in release 4 (January1986) will include Phonetica (an IPA font), Ohrid (a Glagolitic font for Old Church Slavonic), more classical/modern Greek fonts with dead-key accents, an extended version of Vladimir, and some improved level-three versions and double-scalings of current fonts.

Continuing projects include an English-Irish insular script, Georgian, Amharic, Coptic, LinearB, and also LaserWriter fonts for Cyrillic and Armenian.

For NEW users, the project will provide a copy of the current or next release free of charge to Macintosh users who supply the following items:

- a self-addressed, stamped, return mailer
- a covering note/letter with address
- two (2) blank, new, best-quality Macintosh disks with labels and slipcovers

The project returns one disk with the appropriate fonts and documentation. We keep the second disk as our token commission.

To receive an UPGRADE send a disk, a brief cover note, and a stamped, self-addressed return mailer. (The second, token commission disk is only asked of new users who are not already in our files).

When demand is heavy, we are forced to batch-process requests and there may be delays. We operate without a secretary and have no bulk-duplication facility. Since the project's work is freeware, you may make copies for colleagues as you wish.

We release only finished and tested products. We also welcome exchanges of fonts and ideas with other developers.

Later versions of our fonts may add new characters and make stylistic changes in the shape or width of existing characters, but remain otherwise compatible with earlier releases; that is, we try not to change the mapped position

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of a character. In keeping with this principle, we would ask anyone making material alterations to our fonts to rename them in a way that will prevent confusion but still keep their origin plain, for example, your reworking of Pskov might be called PskovB. Also do not forget, in such a case, to edit the comment field on the "information" card connected with a font file.

For new hands—the following is an explanation of how to install a font:

In order to have a font available, it must be installed in the System file of the disk(s) on which you wish to have it. The precise details of resource management (how many fonts to use, which sizes, how to distribute them, and so forth) cannot be treated here. Suffice it to say that one should not overload a disk with fonts (10 fonts maximum is a safe guide).
To install: Copy Font Mover and the appropriate font file(s) onto the system (startup) disk in question (or have them on a second, nonsystem disk in the external drive). Double-click (or select/Open) a font file, select the font(s) you wish to install, click on the <<Copy button, and when the job is done, Quit. You can trash the copies of Font Mover and font file(s) when you have finished with the installation.

Removing a font from the System file is done by double-clicking the Font Mover icon. You can then either Remove a selected font or Copy>> it to the file called Fonts (which can then be renamed later on the desktop).

Project: A Font Workshop

Walter Knapp,
905 NE 114th,
Seattle, WA 98125

The Font Workshop, a disk prepared for the University of Washington, tries to clear up much of the confusion about using the Font Editor, Font Mover, and related tools. Much of the information on the disk was learned by trial and error. This disk tries to centralize the more than dozen technical notes on how to use these utilities. If you would like a free copy, send a disk.

Current status: Completed.

Project: Signifier

Norm Meyrowitz or
Bernard Haan, Institute
for Research in Information
and Scholarship (IRIS),
Box 1946,
Brown University,
Providence, RI 02912

Signifier is not simply a set of fonts. It comes professionally packaged with a disk and a 12-page manual with a center spread that doubles as a reference card for keyboard placement. The Signifier also features a remapped keyboard that provides additional diacritic keys to support the needs of Greek and Cyrillic. Yet the keyboard mapping was designed so that you can use the standard Macintosh fonts—as well as Greek and Cyrillic—without any changes. The user simply installs the Signifier keyboard once, and then never has to

Fonts

switch keyboard mappings again. The mappings are based on the IBM Selectric key placements, the only "standard" our experts were unable to uncover.

The Signifier allows the creation of combined glyphs (omega with a circumflex and rough breathing mark, for example) in the standard Macintosh way: by hitting an accent ("dead" key (circumflex/rough)) followed by the base letter (omega). Scholars do not have to memorize the placement of the combined letters on the keyboard, but only need to memorize the base letters and the diacritics. Both the Cyrillic and Greek orthographies have been approved by the experts at Brown, Harvard, and Notre Dame. Transliteration fonts have been created to allow any Greek or Cyrillic text to be selected and instantly transformed into the Transliterated Roman equivalent. LaserWriter support for these fonts is planned. It is hoped that schools will adopt these as a standard so that there are not dozens and dozens of font versions around.

Current status: Completed. Cost is $15 to AUC schools. **Send order to IRIS address.**

Project: Bengali Font

Dr. H. Hossain, Department of Environmental Planning University of Melbourne

Current status: Unknown.

Project: Einstein Fontech

Sciensoft,
P.O. Box 6311,
Lubbock, TX 79413

This is a general-purpose math and science font that comes in six sizes (9, 10, 12, 18, 20, and 24 point) and is designed to be used with disk-based MacWrite. It has special symbols for operators such as increasing and decreasing limits, and direct sums and products, as well as symbols for typing molecules and chemical reactions. The availability of six font sizes enables the user to type expressions in the exponent and subscript, as well as in limits of integrals and summation signs, using the smaller size fonts for really nice-looking expressions. Available from Sciensoft, P.O. Box 6311, Lubbock, TX 79413; (806) 794-2833.
Current status: Completed. For a disk with installed font and instructions, please send $18.

Project: Fonts

The following foreign-language character sets (and sizes) are currently available from Wayne State University:

- **Colophon: A complete set of accented characters for Classical Greek. Available in five sizes: 10, 12, 18, 20, and 24 points. (The 18-point size also creates an acceptable 9-point character when printing in high quality.**

Fonts

Documentation Librarian
Computing Services Center
Wayne State University
5925 Woodward Avenue
Detroit, MI 48202

• Yerevan: A complete Armenian character set, including characters with added punctuation marks. Available in three sizes: 10, 12 and 18 points.

• Warszawa: An adaptation of Geneva that adds all of the Polish special characters (including upper-case forms for titling). Available in all sizes supported by Geneva.

• Krakow: An adaptation of New York that adds all of the Polish special characters (including upper-case forms for titling). Available in all sizes supported by New York.

• Gdansk: An adaptation of Toronto that adds all of the Polish special characters (including upper-case forms for titling). Available in all sizes supported by Toronto.

• Kyiv: A complete Ukrainian character set, available in three sizes: 10, 12, and 18 points.

• Moscow: A complete Russian character set, arranged according to the IBM Russian keyboard. Available in three sizes: 10, 12, and 18 points.

• Mockba: A complete Russian character set, identical with Moscow except for the keyboard arrangement. Mockba follows the Soviet keyboard and is available in three sizes: 10, 12, and 18 points.

In addition, fonts are available for four California Indian languages: Hupa, Karuk, Tolowa and Yurok. These fonts are adaptations of the Geneva font to reflect the specific versions of the Unifon alphabet used by each of these nations. The fonts are available in six sizes: 9, 10, 12, 14, 18 and 24 points.

Project: Specialized Laser Fonts

Allotype Typographics
1600 Packard Road
Suite 5
Ann Arbor, MI 48104

A series of PostScript fonts for the LaserWriter printer is also under development (completion expected by January 1986). These will be distributed commercially (prices not yet set).

The fonts under development include the following:

• Kadmos: A classical Greek font based on the Symbol font provided with the LaserWriter, but with a complete set of accented characters and specialized papyrological symbols. Available in two keyboard configurations to match either the SMK GreekKeys keyboard or the Colophon (Wayne State University) keyboard.

Fonts

• Scientific Word Processing Fonts: Two fonts, based on the Times™ and Helvetica™ Roman fonts, containing a subset of the scientific symbols of the Symbol font in addition to the complete standard Roman characters (including standard European diacritical marks). This is a convenience font to avoid having to switch back and forth between Times or Helvetica and the Symbol font.

• Chemical Structures: A font consisting of more than 125 of the most common chemical structures, bonds, and element abbreviations, for use in word-processing documents and MacDraw or MacPaint.

• Times and Helvetica Polish: Versions of Times and Helvetica in all four styles (Roman, Italic, Bold, and Bold Italic) with the extra Polish characters added.

• Small Caps: Small-caps font sets for Times and Helvetica (in all four styles). Available also for the Polish character sets.

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and New Services,
Computation Center,
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Project: Greek fonts

Alternate font development is also taking place on the University of Chicago campus. Perhaps the most complete Greek font package, SMK GreekKeys, is commercially available for $25. This package includes two different fonts in 10 and 20 points, a keyboard driver with 11 dead keys, and a MacTerminal document that displays both Greek and English, and may be used with an on-line Greek data base: the Thesaurus Linguae Grecae. Other scholars at the Oriental Institute, Argonne National Laboratory, and various departments have also created specialized fonts: Gaelic, Cyrillic, Hebrew, Tamil, Devanagari, Vilne, and Armenian.

Current status: Completed.

Project: Keyfont

This project displays fonts stored in FFIL files or different systems.

C.F. Miller, Department of Mathematics
University of Melbourne

Current status: Complete.

Fonts

Project: ANUMath Font

Neville Smythe, Department of Mathematics
Australian National University

Current status: Complete.

Project: Sanskrit and Thai Fonts (plus other Asian fonts)

J. Radnell and P. Wesely-Smith
Department of Asian Studies
Australian National University

Current status: Unknown.

Project: FONTS

Designed by Marc Cogan (Department of Humanities)
Wayne State University
with Ruth Bennett (Bilingual Emphasis Program)
Humboldt State University

General: Hupa is a Hupa-language, Unifon-form character font for the Macintosh computer. It is available in seven point sizes: 9, 10, 12, and 14 points for documents, and 18 and 24 points for display or large-character documents. The 18- and 24-point fonts can be used to generate high-resolution 9- and 12-point documents (respectively), and there is, in addition, a 20-point font to generate 10-point high-resolution documents.

Installation: Hupa can be installed in the usual way with the Macintosh Font Mover utility. Double-click on the font icon "Hupa" to call up Font Mover for these fonts. Copy as many of the Hupa fonts as you intend to use.

Keyboard arrangement: All of the Hupa fonts make use of the same keyboard arrangement, and a diagram for the keyboard is included at the end of this document. It can be printed separately by selecting the option "Print Page Range 4 to 4" in the Print menu. The characters on this keyboard diagram are those Unifon characters utilized by the Hupa language (lower case) with the lower-case Roman alphabet, numbers, and punctuation marks printed using the Shift key.

"Missing" characters: Upper-case Roman characters or Unifon characters that are not used in written Hupa can be printed by holding down the Shift and Option keys while striking certain keys.

Dr. Ruth Bennett
Director Bilingual
Emphasis Program
Center for Community
Development
Humboldt State
University
Graves Annex (No. 30)
Arcata, CA 95521.

Fonts

Dr. Ruth Bennett
Director Bilingual
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Accented forms: Vowels with accent marks over them can be generated using the Option key. If the unaccented vowel is found on one of the keys—a, e, i, o, u—the accented form is printed by holding down the Option key while striking the letter "e," and then striking the desired vowel after releasing those two keys. (This is the same procedure as for generating a vowel with the European acute accent in a standard Macintosh font.) If the accented vowel is found on some key other than a, e, i, o, or u, the accented form is printed by simply holding down the Option key while striking the vowel's key.

Technical note: Hupa has been arbitrarily assigned the font ID Number 111, simply to avoid conflict with existing Macintosh fonts. There is no intention to infringe the rights of any software developer to whom this number has been assigned by Apple. If users have purchased any commercial font which also has been given ID #111, it should not be placed in the same System file with Hupa.

Also available: Karuk, Tolowa, and Yurok.

Comments: Questions regarding distribution of these fonts should be addressed to:

History and Politics

Project: Measuring World-Order Values

This project involves the development of a data base for measuring five world-order values: (1) peace, (2) economic well-being, (3) ecological quality, (4) social justice, and (5) political participation. Each value is measured by as many as 50 global indicators. The framework is applied to all 160 states in the international community.

Current status: Unknown.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street Philadelphia, PA

Project: Nonspecialized English Vocabulary

A vocabulary drill based on 300 words of the nonspecialized English vocabulary used in McKay, *et al., A History of Western Society*, Chapters 16—25. Students complete 10 matching exercises aided by "clues" consisting of each word's use in context. The goals of the drill are to enlarge vocabulary, make students more aware of the words they read, and heighten student sensitivity to shades of meaning.

Current status: Completed.

Project: Treaty of Versailles

A series of exercises to teach the major territorial and reparation decisions in the Treaty of Versailles. Uses questioning and interactive map exercises.

Current status: Completed.

Prof. Carolyn Lougee, Stanford University; (415) 497-2300

Project: Historical Simulation: The Would-be Gentleman

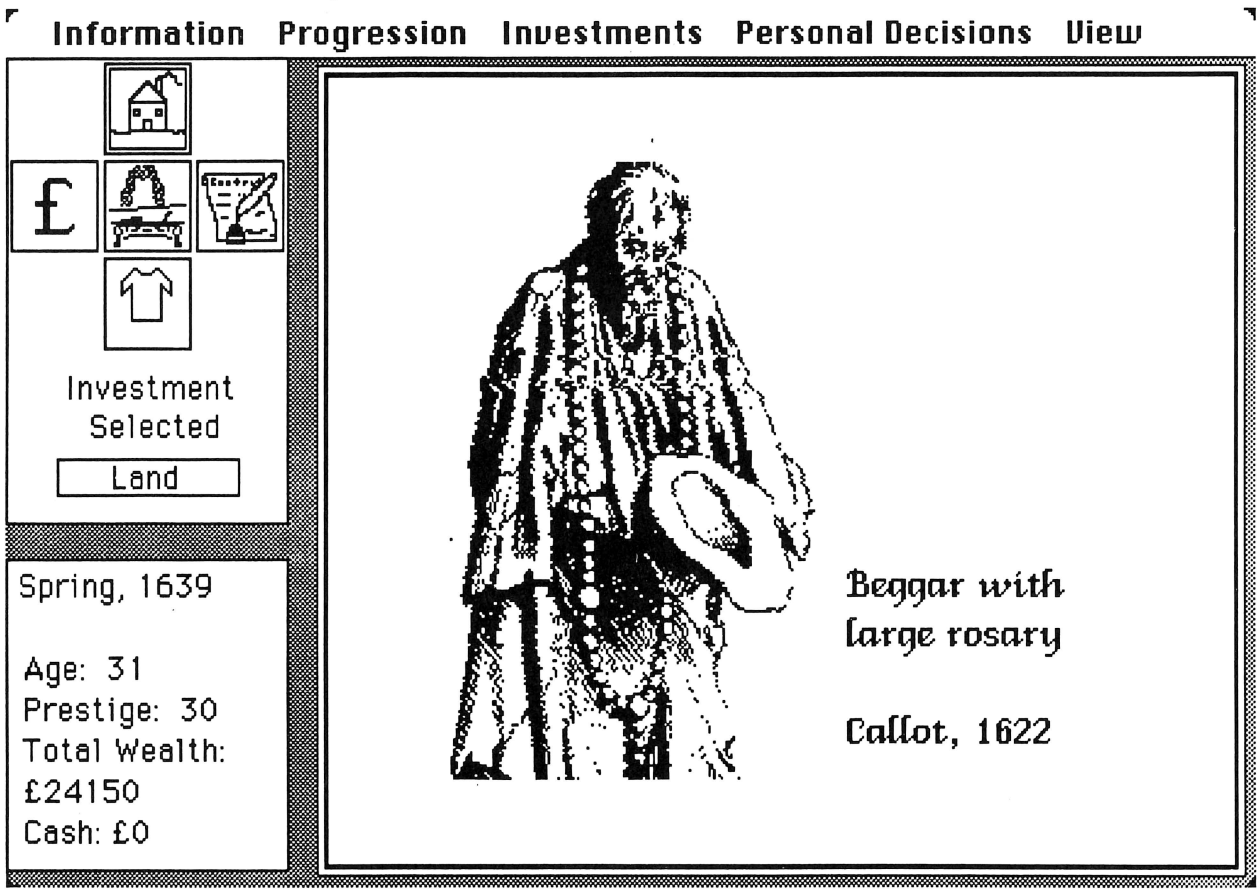
The program, Louis XIV, simulates economic and social life in 17th-century France. Students assume the persona of the head of the Marin family and control lands and investments in the pursuit of wealth and social prominence. The simulation uses the Macintosh computer effectively to emphasize planning and decision making. It is our intention to bring life to some aspects of social life during the reign of the Sun King, Louis XIV. This simulation is designed to be both challenging and historically interesting. Economic decisions and social prestige are both evaluated to determine the outcome of marriage proposals, attempts to hold political office, and purchases of special leases. Nobility must be earned, families planned, and properties managed. In addition, the student must effectively manage a list of social and political contacts, for contacts can determine the success or failure of the Marin family. The simulation is an excellent introduction to the use of the Macintosh computer, because it uses the mouse interface and visual menus to help students through the decision-making process.

Prof. Carolyn Lougee, Stanford University; (415) 497-2300

History and Politics

This program is a sophisticated simulation of economic and social life in 17th-century France. Taking the role of a nobleman, the student progresses through the simulation making economic decisions (such as what to invest in) and social decisions (such as who to marry) that are appropriate for the times. The aim is to maximize wealth and prestige over the two generations of the simulation.

Current status: Completed.



Humanities

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street Philadelphia, PA

Project: Tools for Writers

A text-analysis program that enables the user to analyze a MacWrite document (saved as a text file). Will flag all uses of "to be" and occurrences of anomalous or incorrect words and phrases within a customized dictionary. (Program comes with approximately 200 entries in this dictionary. These may be retained, augmented, or replaced.) Also computes the total number of words per sentence and sentences per paragraph, and word frequency (listed either alphabetically or by frequency).

Current status: Completed.

Project: PreWrite

A prewriting exercise for the analysis of nonfiction articles and essays.

Current Status: Completed.

Project: BRS Simulator

Software that simulates the search environment of BRS, a commercial data-base vendor, used to introduce freshmen to data-base concepts and search strategies before going on-line.

Current status: Completed.

Project: Term Papers, Organizing Principles

The Matrix Organizer is a software program that assists students in writing term papers. This software will enable students to write index cards on the screen and to arrange them by "shuffling" and "dealing" the cards into a grid-shaped structure that will serve as the organizing principle of the paper.

Current status: Unknown.

Project: Prewriting Program

A prewriting program designed to stimulate ideas about the direction a document should take to achieve its purpose. It is useful when students have chosen a topic but have not yet narrowed their focus. The program helps the student to shape the ideas on the topic with a specific reader in mind. It works by asking a series of questions about audience and purpose, and generates a printout of the responses. It ends with a suggestion that the student start writing. Uses Pascal.

Current status: Completed.

Project: Macintoshes in the Writing Program

Greg Colomb of the English department has proposed a pilot using Macintoshes in a writing program for first-year humanities core students.

Current status: Under development.

Humanities

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street Philadelphia, PA

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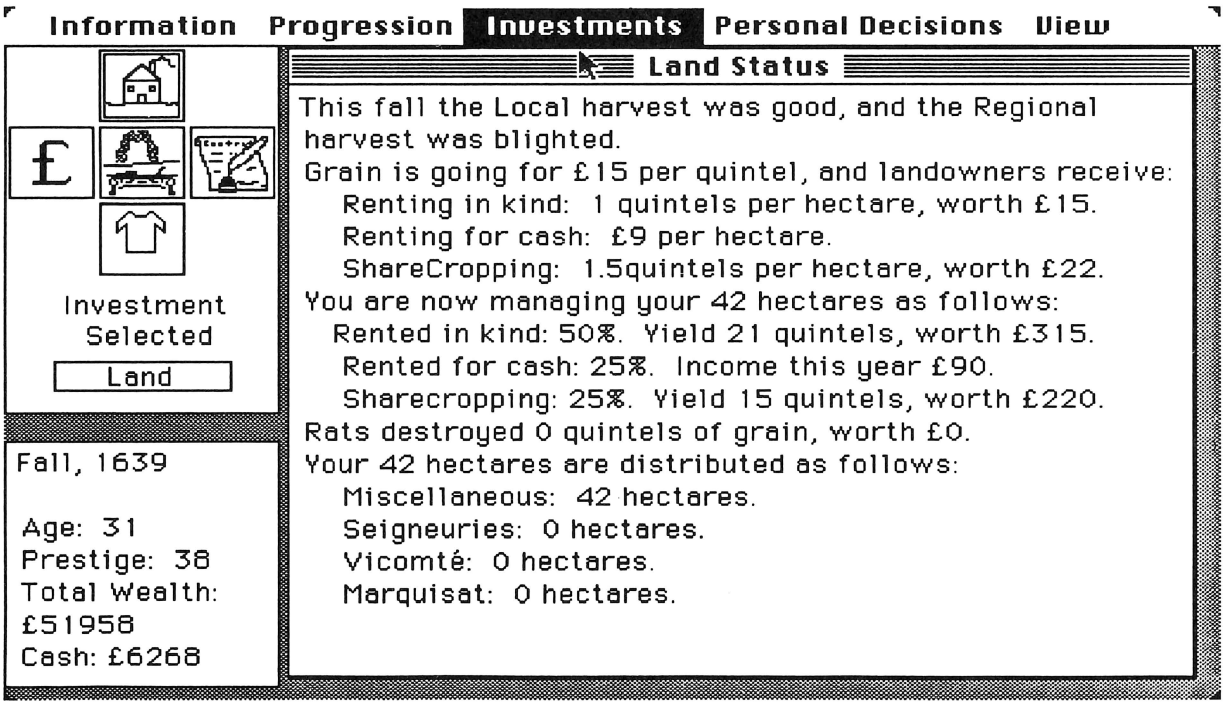
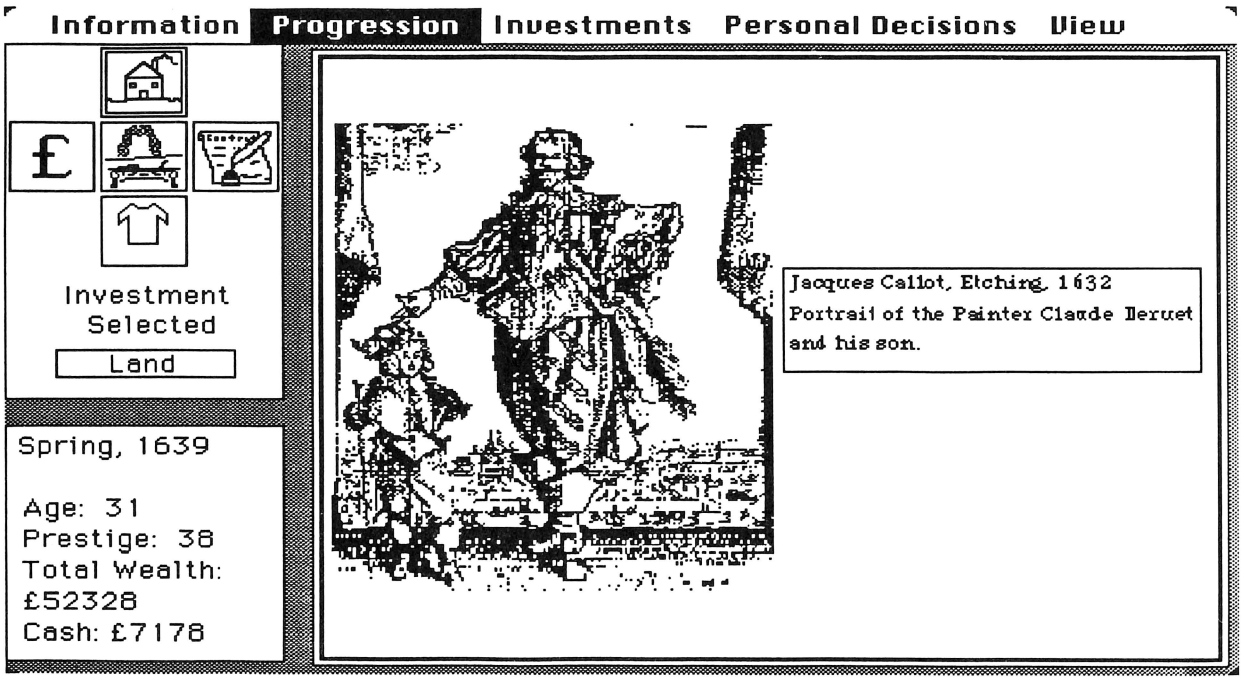
William Sterner, Lead Staff Analyst, Information Technologies and New Services, Computation Center, University of Chicago, 5737 University Ave., Chicago, IL 60637; (312) 962-7172 STAFF.BILL @UCHICAGO

The pictures shown below are actual screen dumps from the historical simulation project described on pages 197 and 198.





Project: Writing Lab

This project explores the feasibility of using the Macintosh in a writing laboratory environment. Students in related projects using other personal computers follow an "invention heuristic" to help them overcome the "blank-page syndrome" and begin writing. Other programs will help them revise and improve their work at the paragraph and essay level. The Macintosh and other personal computer systems will be evaluated in terms of ease of use for writing composition.

Current status: Completed.

Jerome Bump
English, College of Liberal Arts
University of Texas at Austin
Austin, TX 78712

Project: PROSE (Prompted Revision of Student Esays).

Developed by the Writing Workshop (English department), PROSE consists of two modules: one for the student and one for the instructor. Students will submit essays on Macintosh disks in text file format. The instructor will use PROSE to delineate text and insert comments and remarks. When the disk is returned, the student will use the student module to review the comments. The student will be required to view the comments and remarks in an order determined by the instructor; some comments will require some sort of revision before the student can continue (the type of revision is up to the student—the program only looks for keystrokes). For certain common errors, there will be an optional set of exercises the student can perform.

Current status: Expected to be completed in April 1986.

Kate MacGregor,
Cornell University

Languages

Project: Macedonian-English Dictionary

Prof. R. De Bray
Department of Slavonic Languages
Australian National University

Current status: Unknown.

Project: Hypertext/Hypermedia

Computer science department Chairman Andries van Dam acts as a consultant to the project, and Nicole Yankelovich, IRIS project coordinator, is the primary liaison with the Brown faculty.

The Institute for Research in Information and Scholarship has undertaken a long-term research project to design and develop a hypertext-hypermedia system. The research is being conducted within the context of Brown's Scholar's Workstation Project—a decade-long

Norm Meyrowitz,
IRIS Scholar's Workstation Group Manager,
Brown University

Languages

Norm Meyrowitz,
IRIS Scholar's
Workstation
Group Manager,
Brown University

effort directed at creating a campuswide network of high-powered, graphics-based workstations for use in research and teaching in the sciences and liberal arts.

Hypertext is both an author's tool and a reader's medium. With hypertext, authors or groups of authors will be able to link information together, annotate existing texts, and create footnotes that allow readers to see either bibliographic data or the body of the referenced text. Readers will be able to browse through linked, cross-referenced, annotated, footnoted texts in an orderly, but nonsequential manner: an automated encyclopedia of sorts. To learn about Greece from an encyclopedia, for example, students must look up the topic and then retrieve volume after volume to find the host of other articles related to Greece (Acropolis, Plato, Crete, and the like). With a hypertext system, however, students could easily browse through the suggested articles by touching the words.

Using hypertext on a network of computer workstations, students could electronically "hand in" written assignments that include "links" to reference material. The professor (and other students, if permitted), could read the document, examine the reference material, and add personal annotation links—such as comments, criticisms, and suggestions, for revision—to the student's document. These annotations might introduce links to different reference material, perhaps to emphasize a counterargument to a point the student has made. While revising the document, the student could see all the professor's comments and examine the sources containing counterarguments.

Hypermedia is an extension of hypertext that includes such components as pictures, video, voice, and animated computer graphics. With a hypermedia system, an author will be able to create links to complex diagrams, texts, photographs, video documentaries, symphonies, and the like. For example, a music instructor teaching a course on Bach might prepare a hypermedia corpus for the class that could include a biography of the composer's life with links to the score of each musical work mentioned, a documentary film about Bach's life, and other scholarly texts about his work. In turn, each score might include a link to one or more recordings of the piece.

Over the next three years, researchers at IRIS hope to complete a hypertext/hypermedia system that will run on a stand-alone advanced workstation. Once a working prototype is developed, they will extend the system to function over a network, making joint authorship, file transfer, and remote storage of large data bases feasible. In addition to the uses described above, the hypertext/hypermedia system is being designed to provide a framework for educational software development. With funds from the Annenberg/CPB Project, IRIS plans to test this framework in three experimental courses over the next three years.

Current status: A long-term, ongoing project. An initial hypertext/hypermedia prototype allows users to create links to interactive videodisc frames as well as text.

Project: Drill, an English-Language Drill Program

Languages

Drill can be used in almost any course where text- and/or picture-based drilling is useful. Subjects in many different academic disciplines may be addressed using English or other Western European languages such as French, Spanish, or German. The instructor writes drill script in MacWrite, and draws the pictures in MacPaint. Examples of the latter might be grammar tutorials, dictionaries, or thesauri. S/he then gives those files to the student, with a copy of Drill. When Drill is run and the student selects a new drill, he or she is given instructions and questions in a window of text, and types in answers there. At any time the student may bring out any of the aid windows, and scroll through those and the drill window to find what's needed. The student may also end a drill session, or move to the next section within the drill.

The disk includes Drill, (the program), Create a Drill (a script about writing drills), documentation, and sample drills.

Current status: Completed.

The Personal
Computing Center,
1 McNutt Hall,
Dartmouth College,
Hanover, NH 03755;
(603) 646-3249

Project: Statistical Analysis of Text Files

A set of programs for statistical analysis of text files, including Reals-Frequency Distribution (Zipf's Law), stem and suffix counts, and a match to word list (for stopword counts and stylistic analysis).

Current status: First versions completed.

The Personal
Computing Center,
1 McNutt Hall,
Dartmouth College,
Hanover, NH 03755;
(603) 646-3249

Project: Russian Vocabulary

Prof. Van Campen has developed some drills in Russian vocabulary and morphology.

Current status: In progress.

Mike Barlow or
Karen Lee,
Stanford University,
Stanford, CA 94305

Project: The Glossarizer

The Glossarizer was designed as a tool for foreign-language teaching. It particularly simplifies the process of creating side-by-side glossed texts where the source language requires a special character set. The application consists of a simple editor for entering text and a "glossary mode" for attaching notes, translations, or other explanatory information to a word or phrase in the original. Once a glossary file has been created, double-clicking or selecting items in the original text will bring up a window displaying the corresponding note (if one exists). Printing options allow display of the original text, or side-by-side text and notes. In the side-by-side option, items with a glossary item are printed in bold both within the text and in the note. Explanatory information is displayed in a smaller font than the original.

Current status: The Glossarizer is now working.

Katy McKinin
Rice University
ICSA, Box 1892
Houston, Texas
(713) 527-4986

Languages

George Blanco
Curriculum and Instruction
College of Education
University of Texas at Austin
Austin, TX 78712

Project: Spanish Language

The purpose of this program is to perform the following tasks:

- Develop software programs designed to assist bilingual-education students to improve their written language skills in Spanish.
- Provide students with hardware and Spanish-language software in a laboratory setting for class related and independent work.
- Gather data on the effectiveness of this type of computer-assisted instruction for improving Spanish-language writing skills and revise the software accordingly.
- Use the software for in-service training of current bilingual-education teachers.

The data gathered will be the results of pre-testing and post-testing on specific points of Spanish spelling and morphology, and instructors' and students' evaluations of this type of computer-assisted instruction. Training will be conducted in conjunction with curriculum and instruction courses taught primarily in Spanish for bilingual-education students.

Current status: Completed.

Management

Project: Data Base Management Using Pascal Interpreter

W. Naughton and D. Whaiter
Department of Economics and History
Australian National University

Current status: Unknown.

Project: Geographic Informations Systems

Dr. I.D. Bishop
Department of Environmental Planning
University of Melbourne

Current status: Unknown.

Management

Project: Prototyping of Iconic Interface for Accounting Packages

J. Radnell and P. Wesely-Smith
Department of Commerce
Australian National University

Current status: **Preliminary.**

Project: Key Financial Models

This project involves the programming of several key financial models, including a refunding model, lease vs. buy analysis, and a valuation model.

Current status: Probable completion in December 1985.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street

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Project: HRPS.

Conversion of Human Resource Planning Simulation from Prime system to Macintosh. HRPS is a classroom aid.

Current status: **Completed.**

Project: Assisted Linear Programming System

Performs linear programming in two alternate modes: simplex and graphical. Future plans include tutorial features to facilitate student learning. The first component in a toolkit of analytical techniques typically taught in introductory courses in linear programming.

Current status: **Beta version complete.**

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Project: Business Law Case Studies

This application includes summaries of selected cases in business law, each followed by a legal question based on that case. The program branches, based on the user's response, to a menu of up to 10 possible reasons for selecting that response. A specific message is provided for each reason selected. An editing feature allows the user to edit existing cases or add new ones via MacWrite. Editing feature transfers MacWrite documents in the same way as Drexel's MatchMaker authoring tool.

Current status: Unknown.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street

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Management

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FL6BCP@IRISHMVS

Samuel Cox
Finance, College of Business Administration
University of Texas at Austin
Austin, TX 78719

Project: Spreadsheet Optimization

Linus Schrage of the Graduate School of Business is working on a Macintosh version of VINO (Visual INteractrive Optimizer) that will augment spreadsheet "What if?" analysis with a "What's best" facility. Schrage is working in Absoft's FORTRAN.

Current status: Unknown.

Project: Security Price Research (UNIX)

The Center for Research in Security Prices (CRISP) is planning to use Macintoshes as intelligent workstations for a UNIX system.

Current status: Unknown.

Project: Managerial Economics

Basic statistics programs for use in managerial economics are available. We currently provide undergraduate students in these classes with a set of small statistical programs that run on the Macintosh under Microsoft BASIC 2.0. The programs are selected from a menu by mouse control and users enter data through the keyboard or in DATA statements. These programs now include simple regression, multiple regression, nonlinear regression, decomposition analysis, smoothing, and Monte Carlo simulation.

Current status: Completed.

Project: Actuarial Models

This project provides Macintosh systems to the actuarial science and risk management and insurance faculty for the development of a pool of actuarial models used in their research and teaching. Multiplan and TK!Solver will be used. As an example, one model will simulate the operations of a life insurance company and explore what effect new life insurance products would have on a company's solvency. Other programs will model life insurance policies and annuities that illustrate classical textbook theory.

Current status: Completed.

Project: Travel Agents Management System

Steve Coy, Computer Science, University of Western Australia

Current status: Ongoing.

Management

Project: Plant Maintenance Scheduling

Steve Coy, Computer Science, University of Western Australia

Current status: Ongoing.

Project: CPM (Critical path)

Steve Coy, Computer Science, University of Western Australia

Current status: Ongoing.

Math and Statistics

Project: The Data Desk

The Data Desk™ is a full-function statistics package for the Macintosh that provides a desktop environment on which the user manipulates, organizes, edits, and analyzes data. The interface resembles the Finder's desktop, with icons that represent variables, plots, and other objects useful in a data analysis. The user selects icons of the variables and then chooses a command from the appropriate menu. The program uses standard Macintosh conventions to provide full-screen data editing. All calculations take full advantage of SANE (and algorithms have been chosen accordingly). Many of the graphics are interactive.

The Data Desk is a highly interactive statistics package that is both easier to learn and more convenient to use than traditional statistics packages. Current capabilities include data entry and editing, univariate summary statistics, tests and confidence intervals, correlation, simple and multiple regression (including diagnostic statistics), one- and two-way ANOVA, contingency tables and chi-square, scatterplots, histograms, and boxplots, ranking, sorting, generation of random samples from a variety of distributions, transformations specified as general algebraic equations, and generation of patterned data.

The program comes with a 210-page handbook that provides an introduction to statistical methods and examples of their use. The disks provided include copies of the data sets used in the examples and in exercises at the end of most chapters. It has a full table of contents and index, and is suitable as a supplementary text.

Prof. Paul F. Velleman
Box 4555
Ithaca, NY 14852 (607)
256-4411

Math and Statistics

Current Status: The Data Desk has been used in teaching large classes at several universities. A student version, including the program, handbook, and data sets, is available for a suggested list price of $35. This version is fully functional but limits data set size. It is available in quantities of 10 or more, and requires only a Macintosh 128K with one disk drive. The professional version is available for $125 and requires a Macintosh 512K. It has no restrictions on data file size other than disk space.

Project: Multiple Regression Template

David Ellerman,
Computer Sciences,
Boston College,
Chestnut Hill, MA 02167;
(617) 552-3975

This Macintosh Multiplan template performs least-squares multiple regression. It is currently configured for data sets with three or fewer independent variables. The number of data points in the data set can be easily expanded, but it is usually 25. Once the data has been entered, the calculations are initiated via the Calculate Now command. When the calculation stops, the multiple regression results can be obtained from the rest of the spreadsheet. The variance-covariance matrix is given. The ANOVA table is displayed, along with the overall F statistic, R-squared, and the adjusted R-squared statistic. Also included are the multiple regression beta coefficients, their standard errors, and their statistics.

Current status: Completed.

Project: Regression-Sampling Program

David A. Belsley,
Department of Economics,
Boston College-Carney 129,
Chestnut Hill, MA 02167

Reg Sampler is a regression-sampling program that allows graphic depiction of the variation in regression-coefficient estimates that can occur in repeated samples for a given set of explanatory "X" data, or independent variables. The user is able to see the variability in estimated regression parameters that can indeed occur, the meaning of the notion that the Ordinary Least Squares (OLS) estimator is unbiased, and the interrelation of the estimates of the different coefficients. Beyond the direct value of such a demonstration, the user is given new insights into—and appreciation for—the operation of regression, the meaning of regression estimates, and the meaning of tests of significance.

Current status: Completed.

Project: Conformal Mapping Program

Andrea Martin, ICSA -
Rice University,
Houston, TX 77251;
(713) 527-4965

Developed by: Rice Macintosh Software
Concept: Sam Davis, Chemical Engineering
Complex variables make up one of the most visual areas of mathematics. A graphically oriented program displays the effects of mappings of the complex plane on contours. The program computes complex-value functions and allows student specification of the contours and the mappings.

Current status: Completed.

Math and Statistics

Project: Calculus Teaching Package Including a Graphic Tool

Neville Smythe, Department of Mathematics
Australian National University

Current status: To be completed by the end of 1985.

Project: Graphical Display Solutions to Differential Equations

C. Miller, Department of Mathematics
University of Melbourne

Current status: To be completed in March 1986.

Project: Converting MASS STATS Packages from Z8086 to Macintosh

Anna Ferrante, Department of Mathematics
University of Western Australia

Current status: Unknown.

Project: Plotting Derivatives of a Calculus Function

Developed by: Rice Macintosh Software
Concept: Paul Pfeiffer, Mathematical Sciences
This program allows you to define a function with up to seven coefficients, plot the function, and calculate its derivative.

Current status: Completed.

Andrea Martin, ICSA - Rice University, Houston, TX 77251; (713) 527-4965

Project: Linear Programming Template

This application is a Multiplan template using the simplex method to obtain a solution to linear programming problems. It can solve linear programs with five or fewer original variables (not counting slack, surplus, or artificial variables) and five or fewer structural constraints (not counting the usual nonnegativity constraints on the variables). The right-hand side (RHS) of the constraints must be entered as nonnegative, but the constraint relations can be any of three types (<=, =, >=). The objective function can be maximized or minimized.

Current status: Completed.

David Ellerman, Computer Sciences, Boston College, Chestnut Hill, MA 02167; (617) 552-3975

Math and Statistics

Eugene A. Klotz
Swarthmore College
Department of
Mathematics
Swarthmore, PA
19081
(215) 447-7243

Project: Mathematics Laboratory

A package for computer-based instruction of calculus has been developed for the IBM PC. Later this year, we will be porting the program to the Macintosh. Contact : Craig McGowan, Computer Center, University of Rochester, 727 Elmwood Avenue, Rochester, NY 14620

Current status: Under development.

Project: Functions.

The purpose of this project is to develop tools for a graphical study of mathematical functions. The software will be suitable for both calculus and precalculus work. It is intended for exploratory learning use by students and for use by teachers to create demonstration materials. The functions to be studied are polynominals, rational functions, the standard "elementary"functions (including trig., log, exponential, and roots), and their integrals. Topics include the arithmetic of functions (sum, product, quotient, reciprocal), function composition, inverse relations, and motion on a line. The fundamental calculus concepts of differentiation and integration can be studied in terms of their visual meaning.

Current status: Probable completion sometime in 1986.

Project: Calculus Demos

Designed for lecture/classroom demonstrations of related rates, area under a curve, volumes of solids of revolution, rotation of axes, parametric equations, and polar coordinates.

Current status: Probable completion January 1986.

Project: Matrix Algebra

A program that uses rational arithmetic for solving the following problems: transforming a matrix (up to 6 x 12) to reduced row echelon form, solving a linear system (up to six equations in 11 unknowns), multiplying two matrices (each up to 6 x 12), and finding the inverse of a matrix (up to 6 x 6). Has tutorial and automatic modes of operation.

Current status: Completed.

Project: Math Programs

Dr. Snow has created a number of short programs in Microsoft BASIC to do the following:

- Function Graph graphs functions in boxes drawn by the mouse. Allows for graphing several functions in the same box.

- SurfaceGraph graphs transparent surfaces. Axes are positioned by the mouse to allow variations in scaling and perspective.

- SurfaceGraph II graphs opaque surfaces.

- dim V(μ) calculates the dimension of an irreducible representation of the classical simple Lie groups with highest weight.

- Weights calculates the weights of an irreducible representation of any simple Lie group from the highest weight.

- Row/Col Reduce diagonalizes a matrix over Z, using elementary row and column operations. Useful for calculating the cokernel of a map Zn ---> Zn.

Math and Statistics

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Dr. Dennis M. Snow
Department of Mathematics, 203 Computing Center and Math Bldg.,
University of Notre Dame, Notre Dame, IN;
(219) 239-6227

Project: Electrocardiogram Interpretation

EkTeach uses animated graphics and interactive responses via the mouse to teach interpretation of the electrocardiogram and to test the student with respect to the names of the EKG deflections, the amplitudes, and the time relationships of the normal EKG tracing.

Current status: Completed.

Medicine

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Medicine

Bruce Land,
Department of
Neurobioloty,
Cornell University;
(607) 256-4981
c/o Tom Hughes

Project: Neurobiology: Wave Forms and Filters

This program produces a high/low pass filter that is fully controlled by the Macintosh mouse. The filter is a first-order, infinite-impulse response design, digitized by an amplitude-adjusted, impulse-invariant transform. It acts like a simple RC filter. The application is written in MacFORTH. In the input window, one can select sine, step, or impulse waveforms or, by clicking in the content region, free-form input. The filtered waveform appears in the output window. The cutoff frequency of the filter is chosen in the ouput window, and the high/low selection is done by menu. The unit of frequency is cycles per window. By: Bruce Land, Cornell University

Current status: Completed. **Available on Creative Solutions MacForth Demo Disk.**

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Information Technologies
and New Services,
Computation Center,
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Project: Analysis of Photomicrographs of Brain Cell Aggregates

In the pharmacology and physiology department, Stephen Sellers has written a program for the image analysis of photomicrographs of brain cell aggregates. Done in Microsoft BASIC, the program aids in the calculation of aggregate area, cell counts, tissue volumes, statistical analysis, and report writing. The application utilizes the mouse to trace a 35mm slide image projected onto the Macintosh screen to replace time-consuming manual procedures. Thus, for a factor of 10 less than the cost of a digitizing system, researchers have been able to greatly improve their experimental precision and reduce the time period for data collection by a factor of 7.

Current status: Unknown.

Mike Barlow or Karen Lee,
IRIS, Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Physiology

Models of the dynamics of physiological systems, produced by Professor Heller of the biology department.

Current status: To be completed in winter 1985/86.

Mike Barlow or Karen Lee,
IRIS, Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Respirator Simulation

The program, designed by Professor Kohatsu, allows the student to simulate the effects of different responses to data from a patient on an artificial respirator.

Current status: To be completed in winter 1985/86.

Mike Barlow or Karen Lee,
IRIS, Cypress Hall,
Stanford University,
Stanford, CA 94305

Project: Electrolyte Disturbances and Treatment

In Professor Maffly's program, students use help screens and the Calculator to answer questions concerning electrolytes.

Current status: Completed.

Medicine

Project: Understanding Flow Cytometry

The software will be developed in four segments: (1) utilities for interfacing with flow cytometers via serial ports and receiving and sending data files, (2) graphic display and data-manipulation routines, including an emulator of real-time data acquisition by flow cytometer instruments, (3) statistical and data-reduction programs, whose output will be objects for the graphics modules, and (4) concepts and models of cell cycle and cell differentiation, allowing "What if?" sorts of speculation in an environment of manipulable graphic objects derived from flow cytometric data. Written in Lisa Pascal, Modula-2, and C.

Current status: Completion expected in summer 1986.

Ron Worthington, Ph.D.,
Texas Tech Health
Science Center,
Dept. of Cell Biology
& Anatomy,
Lubbock, TX 79430-0001;
(806) 743-2707

Project: Cell Biology Lab Uses

This project will bring simplicity and consistency to the manipulation of data from complex experiments in an experimental hematology lab. The software will facilitate data handling for entry-level students and personnel, and will assist scientists in the interpretation of results.
By: Ron Worthington Ph.D., Texas Tech

Current status: Completed.

Ron Worthington, Ph.D.,
Texas Tech Health
Science Center,
Dept. of Cell Biology
& Anatomy,
Lubbock, TX 79430-0001;
(806) 743-2707

Project: Pharmacy Simulations

The purpose of this project is to perform the following tasks:

- **Implement a systematic curricular scheme to achieve "computer literacy" for Doctor of Pharmacy students.**
- **Incorporate computer simulations and modeling into clinical experimental rotations to assist in the development of patient consultations.**
- **Utilize user-friendly technology to facilitate student education.**
- **Implement patient data bases.**
- **Use drug information and retrieval and literature searches to answer questions from patient care rounds.**

Current status: **Completed.**

**Larry Ereshevsky
Pharmacy, College of
Pharmacy,
University of Texas at
Austin,
Austin, TX 78712**

Medicine

Project: Ekteach.

Teachers interpretation of the electrocardiogram and tests student with respect to the names of the EKG deflections, the amplitudes, and the time relationships of the normal EKG tracing.

Current status: Completed.

Miscellaneous

Project: Programs for Ecological and Statistical Analysis

A. Cockburn, Department of Zoology
Australian National University

Current status: Unknown.

Project: Drexel Disk

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

The Drexel Disk uses an interactive map of the Drexel University campus to orient new Macintosh users to the microcomputer-related facilities available. Also gives tips on file handling, making backups, using MacWrite for term-paper production, and so forth. An interesting blend of text and graphics.

Current status: Completed.

Project: Data Base on Ethical/Legal Issues.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

A bibliographic data base that contains references to books and articles on ethical/legal issues of information distribution. Topics include censorship, freedom of information vs. privacy, copyright, impact of the "information revolution" on economics, education, and politics, and more. Requires SCIMATE for the IBM PC. When SCIMATE is avalable for the Macintosh, the bibliography will be converted to it.

Current status: Completed.

Project: Drexel Plot.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

A graphing package designed to plot on a grid data pairs entered from the keyboard or via a SYLK file. Up to four data sets (or any selection of data points from a set) can be plotted. Graphs can be automatically or manually scaled and their display can be modified (using tic marks, grid lines, plot symbols,and so forth). Completed graphs may be pasted into MacPaint for further editing.

Current status: Completed.

Miscellaneous

Project: BenchTop Products for the Sciences

The BenchTop product line was developed at Reed College. It was designed to solve a traditional problem facing science teachers and their students: budgetary constraints in regard to laboratory apparatus.

The Macintosh can display iconic instrumentation, that is, cartoons of apparatus. Such iconic apparatus are equivalent to traditional apparatus, provided the data displayed is real, and the panel operations are precise.

The chief software products are The BenchTop, which creates a powerful laboratory network system, and Rascal (see description under "Computer Science"), a real-time Pascal. These applications allow the user to define and operate instruments. The hardware products are a Universal Microcontroller, a laboratory single-board computer based on Intel microprocessors; and the BenchTop Instrument, a customizable, shielded instrument box. Both hardware devices talk to the Macintosh according to a rigorous protocol.

Current status: Universal Microcontroller completed. Consortium price: $500. Retail price: $750.

Metaresearch, Inc.,
1100 SE Woodward,
Portland, OR 09702;
(503) 232-1712

Project: Lesson Writer

This is an authoring tool that enables the user to create short lessons using basic MacWrite procedures and any graphics that can be transferred via the standard Clipboard. Each item may contain up to eight lines of text and/or one graphic. Permits up to 30 expected responses with a specific message for each response. Response may be either typed-in text or object selection. Author specifies recognition/nonrecognition of both case and spacing and acceptance of partial strings or exact match. Branching, scoring, and two-level hints are also available for each item.

Current status: Completed.

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street,
Philadelphia, PA

Project: MacPress

Researchers at Brown (IRIS) are presently testing a program that allows documents created with MacWrite to be printed on the Xerox 9700 Laser Printer.

The idea for the development of the MacPress program grew out of the Lisa Project, as IRIS needs-analysts and a faculty committee identified several crucial areas for research and development. One of these projects involved developing an interface from a microcomputer to a high-quality printer. IRIS staff considered a number of options, including an interface between the Apple Lisa and the 9700.

Several intervening factors, however, caused IRIS to decide in favor of a Macintosh-9700 link. Apple's shift in development emphasis away from the Lisa and toward the Macintosh meant that few or no very useful new applications were expected to be released for the Lisa.

Norm Meyrowitz,
Scholar's Workstation
Group Manager,
Brown University

Miscellaneous

Meanwhile, the Macintosh, the Lisa's portable and more affordable kin, was enjoying a tremendous popularity at Brown. The affordability of Macintosh, along with its high-quality graphics and black-and-white bit-mapped display, meant that the Macintosh could be considered a viable entry-level microcomputer for students. A Macintosh-9700 link would thus provide students with the high-quality printing they would otherwise be unable to afford.

IRIS systems researcher Tom Padula coordinated a team of developers from IRIS, the computer science department, and the Computer Center that put together the intricate structure and wrote the complex programs needed to create the link. The user, however, need never know how to operate anything other than a Macintosh, because the interface works just like all Macintosh programs. Using the mouse, the user simply selects the desired printer and logs on to the Computer Center's IBM 3081 mainframe. MacPress accepts the information and stores it as a default for future use. Moving to the File menu, the user selects Print and then the appropriate file ("Resume") from the displayed list of documents contained on the disk.

Metaresearch, Inc.,
1100 SE Woodward,
Portland, OR 09702;
(503) 232-1712

From there, a complex series of translation and transfer programs takes over, but this process is transparent to users; all they are required to do is walk over to the Computer Center and pick up the printout. IRIS will release the program to the Brown community during the spring semester. The program now works from T-Boxes and modems, and performs a number of complex formatting functions.

As part of the campuswide Scholar's Workstation Project, MacPress will aid in the migration of computer use away from mainframe/terminal services and toward distributed networks of graphics-based workstations. MacPress can be modified easily to accommodate other printers, eventually even lower-throughput laser printers housed in dormitories or other convenient campus locations.

Current status: Completed.

Project: Order Processing Program

MacOrder is a program used by the University of Michigan to process Consortium computer orders; it is written in Microsoft BASIC. MacOrder takes information such as name, address, university title, and local phone number, and prints it onto the university's configuration form along with stock numbers, item and total costs, and sales tax for the items ordered. Data is saved in a disk file; subsequently, sales per item can be totaled and listed using a related program called MacOrder-Report. Each program can be easily modified to include more or fewer items, and to print on to other forms.

Bill Wrobleski,
Microcomputer
Education Center,
University of Michigan,
Ann Arbor, MI 48109;
(313) 764-5356

Current status: Completed.

Project: A Skeleton Macintosh Application

Miscellaneous

Skel is used for teaching Macintosh development. It is a skeleton demo Macintosh program written in Lisa Pascal. Its purpose is to illustrate in a clear fashion, isolated from any particular application, the basic code for handling a simple Macintosh user interface.

It strives to be correct as far as it goes, without shortcuts that would lead to trouble in larger applications.

To use Skel, study the source code. Modify it to test your knowledge. Steal working pieces of code for your own programs. Beat on it. Subject it to cruel and unusual punishment. Pay heed to its warnings. More sturdy instructions are given in its source code.

The distribution disk includes Skel (the program), Bone (an empty file), Skel.TEXT (the Lisa Pascal source code), SkelR.TEXT (the Resource Definition file), SkelX.TEXT (an EXEC file to re-create it, using the Lisa Pascal Workshop 2.0 or 3.0). Developed by Steve Maker.
By: The Personal Computer Center, Dartmouth College

The Personal
Computing Center
1 McNutt Hall
Dartmouth College
Hanover, NH 03755
(603) 646-3249

Current status: Completed. **Now in Version 2.4.** Send $4 for the disk.

Project: ColorPaint

ColorPaint is a Macintosh application for creating color images in the essential style of MacPaint, but with enhancements for three-dimensional graphics, shading and of course, color. The color capability is obtained by connecting the Macintosh serially to a Vectrix VX384 color driver equipped with a high-resolution RGB color monitor.

ColorPaint was developed at Reed College by R. Crandall, M. Colgrove, and S. Gillespie. The application was created entirely within the Rascal (real-time Pascal) compiler environment. The key Rascal sources include the ColorPaint source together with a Rascal library that converts QuickDraw calls into Vectrix VX384 commands. Rascal was a clear choice for the development, especially since serial port requirements figure so strongly in this application. The current application shuttles bidirectional data between Macintosh and Vectrix at 19.2K baud, resulting in reasonably smooth mouse coverage of the color monitor screen.

The main feature of ColorPaint is of course, the existence of color freedom. But there are other interesting options that were conceived to increase the painter's efficiency. In particular, geometrical object drawing and complex shading can be readily created, even by the novice user, with some new 3D features. A summary of ColorPaint features follows:

**R. Crandall
Reed College
Portland, OR 97202
(503) 771-1112,
ext.277**

Miscellaneous

R. Crandall
Reed College
Portland, OR 97202
(503) 771-1112,
ext.277

- **440- X 468-pixel canvas, separate tool and palette array area.**
- **Mouse control of color screen for painting, and of the Macintosh screen for menus and messages.**
- **Complete spectral access, by hue, tint, and saturation, to the 16 million VX384 colors.**
- **70-color editable palette plus seven 50-color automatic shading palettes.**
- **Powerful tool set, with each tool color independent (see tool descriptions below).**
- **Ability to save and load whole pictures and/or palettes to and from disk.**
- **Cut, copy, paste, and decal capability for duplicating regions.**
- **Magnifier ("color FatBits") option for precise, per-pixel editing.**
- **3-D box, ribbon, and sphere painting tools.**
- **Bit-pattern editing for rectangular regions.**
- **Option for continuous spectral shading.**

Current status : **Completed.**

Project: Atlas

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Computing Center
1 McNutt Hall
Dartmouth College
Hanover, NH 03755
(603) 646-3249

Atlas can be used in any field to teach by means of a pictorial atlas on the Macintosh. The instructor (or student) creates a set of images (with MacPaint, a video digitizer, or other graphics program) on the desired subject (for instance European history, or frog anatomy), and gives the resulting data set to the students on a Macintosh disk with the Atlas program. When Atlas is run, it allows students to view the images on the Macintosh; specify a set of overlays to view (for example rivers, towns, roads, or the nervous system, circulatory, or skeletal system); and zoom in and out to levels of greater or lesser detail, with the overlay set remaining intact. Version 0.2 is a preliminary version. Developed by Carl Spitzer from a concept by Leo Spitzer and David Lagomarsino of the history department.
By: The Personal Computer Center, Dartmouth College

Current status: Completed. **Now in Version .22.** Send $4 for the disk.

Miscellaneous

Project: Overlay

Overlay is a program for aligning MacPaint images in preparation for use in Atlas, which can display several images on top of one another. The first step is to use MacPaint to put registration marks on each image to be aligned and on a blank overlay. The second step is to use Overlay: call up the blank overlay, align the images, freeze them, and save the result as that overlay. If you put MacPaint and Overlay on the same disk, you can exit directly from Overlay to MacPaint.

Current status: Completed.

The Personal Computing Store, 1 McNutt Hall, Dartmouth College, Hanover, NH 03755

Project: Film Design

Communication students in a film and video class learn "storyboarding" by editing images recorded onto a Macintosh disk using a video camera in conjunction with a commercial program called MacVision. The students can change the order of the images using the "slide-show" capability of a commercial editor, ThinkTank 512. The final storyboard includes a sequence of images and their shot descriptions.

Current status: Completed

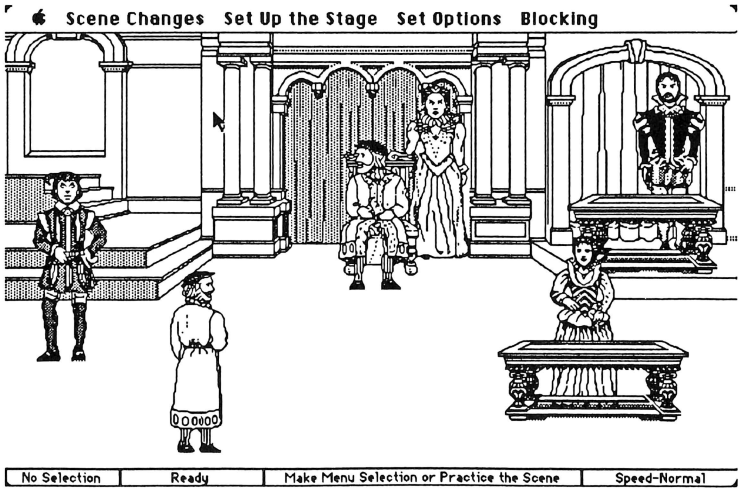
Professor Kristine Samuelson, Department of Communcation Stanford University, Stanford, CA

Project: The TheaterGame

This program allows "blocking" of a play on a Macintosh. The students use an interactive animation editor to move the characters across the stage and alter their orientation. The result is an animation of a scene that is synchronized with a recording of the spoken text. In addition, a videodisc-based instructional system gives students access to an archive of theater history slides and provides tutorials in text interpretation.

Current status: Completed.

Professor Larry Friedlander, Department of English Stanford University, Stanford, CA

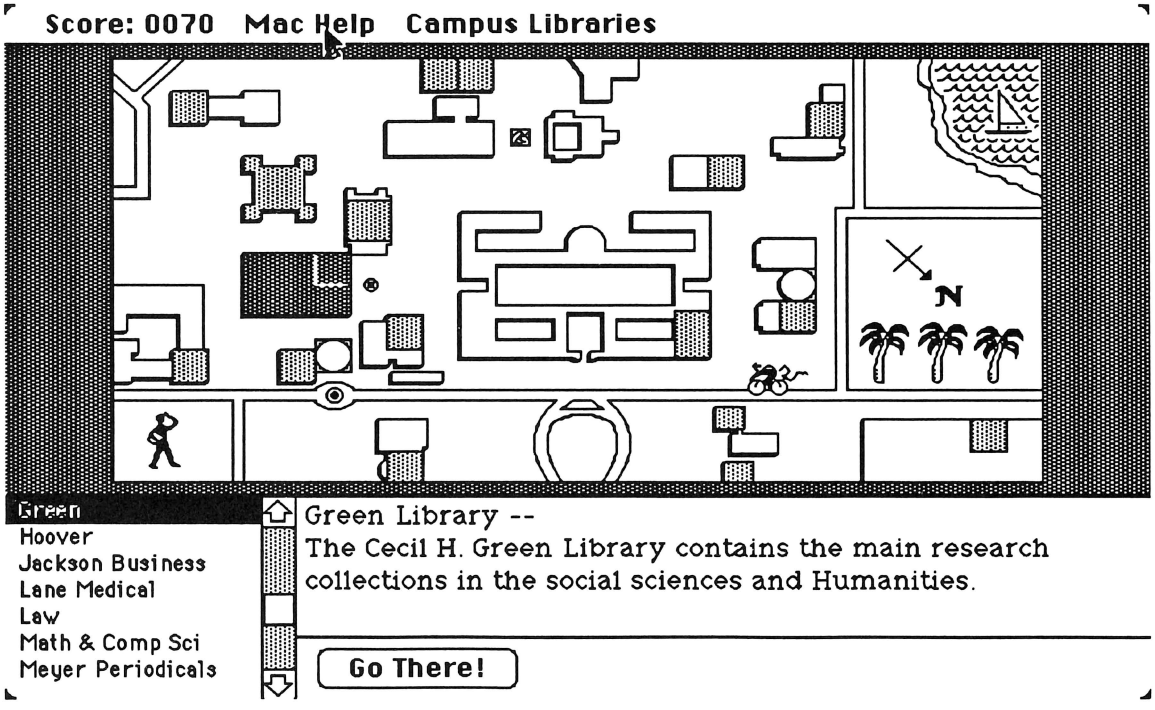


Deborah Murphy,
Meyer Memorial
Library
Stanford University,
Stanford, CA

Project: Bibliomania

This simulation introduces students to the use of libraries on campus. The graphics-oriented program also guides the student through the intricacies of searching periodical indexes and an on-line catalog.

Current status: **Near completion.**



Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street,
Philadelphia, PA

Project: Mac-Prime-Mac

This application is a protocol that allows you to transfer text or binary files from a Macintosh to a Prime Computer and back to a Macintosh, thereby allowing the Prime Computer to function as a file server.

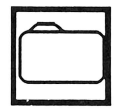
Current status: Completed.

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street,
Philadelphia, PA

Project: User Interface Demo

This application was designed to introduce potential developers to the Apple terminology associated with the Macintosh and to promote the understanding of the various options available within the Macintosh user interface.

Current status: Completed.



Miscellaneous

Project: Scientific Graphics.

Scientific data analyses will be the focus of this project. The user will have the ability to specify a function to be plotted or have a smooth line drawn between data points. No pie charts here!

Current status: Under development.

Craig McGowan
Computer Center
University of
Rochester
727 Elmwood Avenue
Rochester, NY 14620

Project: MAC BRAID.

This program computes the Alexander Polynomial of a given Knot. The Knot is specified by giving the cross numbers of its braid representation. (Macintosh Pascal)

Current status : Completed.

Richard Bedient
Hamilton College
Clinton, NY 13323
(315) 859-4138

Project: Mainframe Print Servers.

As a value-added service provided to SEAGate, Macintosh users will be able to print their documents remotely using a VAX or Pyramid Computer as a print server for the LaserWriter or other PostScript machines. In addition, they will be able to convert MacWrite documents to troff to allow addition of technical features using Eqn.

Current status: Under development.

Craig McGowan
Computer Center
University of
Rochester
727 Elmwood Avenue
Rochester, NY 14620

Project: Electronic Chalkboard.

This project uses a Macintosh as a novel electronic chalkboard, permitting drama students in directing classes to illustrate body/eye focus and movement patterns of actors in harmony with recorded voices. The student director will be able to do the following:

- Draw a ground plan to scale of a stage setting on the screen, complete with labels for doors, windows, and furnishings; and store the labeled ground plan.
- Place actors/symbols on the ground plan screen.
- Trace the movement patterns for as many as 20 actors/symbols on the ground plan screen.
- Experiment with, test, and evaluate actor placement and movement patterns.

Current status: Completed.

Bernerd Engel
Drama, College of Fine
Arts, University of
Texas at Austin,
Austin, TX 78712

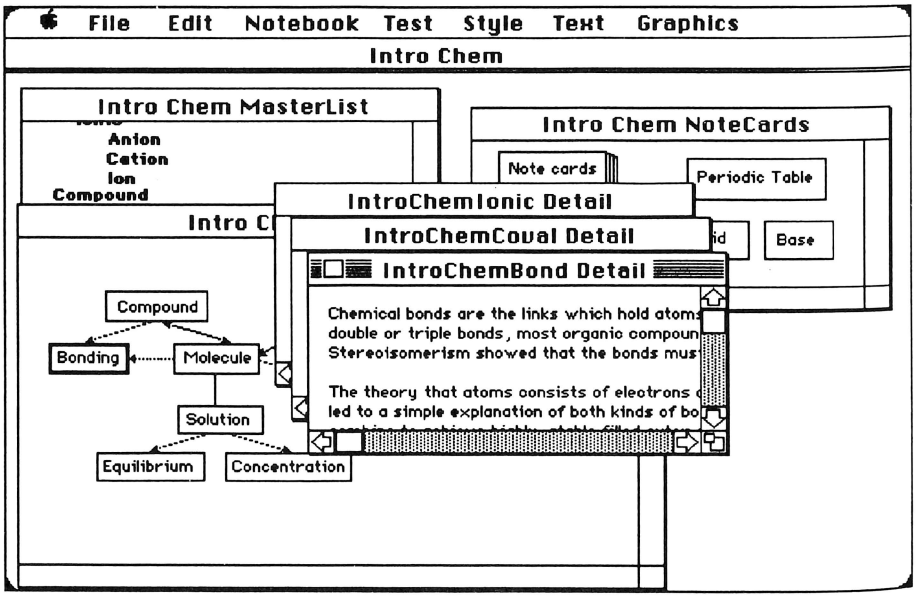
Miscellaneous

Dr. Robert B. Kozma
John Van Roekel
School of Education
College of Engineering
University of Michigan
(313) 764-8420

Project: The Learning Tool

Whereas computer-aided instruction is at least twenty years old, computer-aided learning is still in its infancy. Professor Kozma and John Van Roekel employed concepts of cognitive psychology to design an applications package intended to help college and high school students learn any subject matter. The Learning Tool is an "electronic notebook" that uses all of the Macintosh conventions to allow students to store course detailed notes or other textual or graphic information in "notecard" windows. Students can do Boolean searches of their notes to facilitate retrieval of needed information, and can use multiple open notecard windows to maximize immediately available information. Although this application has basic text and graphics tools, The Learning Tool can exchange information with more comprehensive packages to allow students to use their notes to write term papers or to paste complex graphics into their notecards. The icons for each notecard can be graphically organized and linked in a "concept map" that displays user defined relationships (temporal, causal, associative, etc.) among the concepts. The ability to create any number of submaps allows the user to create complex relationships in compact networks. The creation and modification of these networks is intended to facilitate the learner's evolving understanding of relationships among concepts. The package also allows students to create self-tests to assist in their studying of factual details and conceptual relationships. The package may also be useful to faculty members wanting to organize their lecture notes and to cognitive researchers interested in studying student learning.

Current status: Testing in Winter of 1985, distribution planned for Fall of 1986.



Music

Project: Mozart

Mozart is used in introductory music composition courses. It is intended to give the music student with no formal experience in composition the opportunity to experiment with musical arrangement, tempo, articulation, and dynamics. It allows the user to compose a minuet from any of six predefined two-measure phrases, written by Mozart. The minuet may be up to eight phrases long. The user controls the arrangement of the phrases, as well as the tempo, articulation, and dynamics, by dragging items from any of four palettes onto a staff. The minuet may be played on the Macintosh's built-in speaker or saved to disk to be retrieved later. The staff may be printed on an ImageWriter. Version 2.0 has all the help present in the application file and a startup screen.
By: The Personal Computing Center - Dartmouth College

Current status: Available now. The disk comes with AppleTones on it (see next entry). Send $4 for the disk (containing the two applications). Now in Version 2.0.

The Personal
Computing Center
1 McNutt Hall,
Dartmouth College,
Hanover, NH 03755;
(603) 646-3249

Project: AppleTones

AppleTones is a music-building program on the Macintosh. It is a tool that teaches the importance of four things in the composition and arrangement of music: repetition, silence, changes in volume, and timbre. Twelve predefined sounds can be arranged and their duration, timbre, and volume can be changed. The user composes a piece by dragging any of the available sounds from a palette onto a staff. The vertical position of the sound determines its timbre, the width of the sound.
By: The Personal Computing Center, Dartmouth College

Current status: Comes on disk with Mozart. **Now in Version 2.0.**

The Personal
Computing Center
1 McNutt Hall,
Dartmouth College,
Hanover, NH 03755;
(603) 646-3249

Project: Musical Slide Show

With no need to become programmers, users will be able to write music on the screen (notation that can be printed out), to hear the score played through the Macintosh's speaker (or an external system), to add text and graphics as required, and to edit the results to form a "slide." A series of these slides can be used to create programmed lessons for various music courses.

Current status: Probable completion in September 1985.

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street,
Philadelphia, PA

Project: Baroque Guitar Data Base

The Baroque Guitar Data Base utilizes 1stBASE by DeskTop Software Corporation. To date, over 2,000 separate melodies have been entered into the system, with each entry including author, title, source, page, meter, time signature, key, length, melody (in the original key), melody (transposed to the key of C), type of piece (allemande, courante, prelude, and so forth), correspondences in other

Craig H. Russell,
Department of Music,
California Polytechnic
State University,
San Luis Obispo, CA
93407

Music

sources, and additional notes of interest. The data base presently emphasizes baroque guitar sources after 1670. The system can easily sort and sift through the data to compile lists or search out correspondences. Furthermore, the Baroque Guitar Data Base can serve as a thematic index for baroque guitar sources. Since the baroque guitar melodies have been transcribed from tablature notation into regular pitch names (both in the original key and transposed to a universal "key of C") nonguitarists can instantaneously search out melodies in baroque guitar sources without having to transcribe pages of tablature notation.

By: Craig H. Russell - Cal Poly

Current status: Ongoing.

Project: Simulation of 18th-Century Organ

Mike Barlow or Karen Lee,
IRIS, Cypress Hall,
Stanford University,
Stanford, CA 94305

A simulation of an 18th-century organ in order to illustrate the musical articulation and phrasing of the time. The program, devised by Professor Houle of the music department, will produce sound and musical notation.

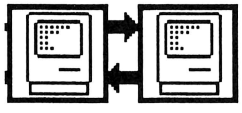
Current status: Unknown.

Project: Music Theory

Bruce Campbell
Eastman School of Music
University of Rochester
727 Elmwood Avenue
Rochester, NY 14620

***Atonal Set Identifier* —From pitch class information supplied by the user, the application will return the set name, transposition level, interval vector, and names of related sets (z, m, mi), according to Allen Forte's nomenclature (The Theory of Atonal Music).**
***12-Tone and Invariance Matrix* —The application will compute the 12 "magic square," identify the constituent hexachord, and draw the invariance matrix according to user specification.**

Current status: Under development.



Networks

Project: AppleTalk Network

Jim Perry,
Kiewit
Computation Center,
Dartmouth College;
(603) 646-2643

Darterminal provides network services to Macintoshes on an AppleTalk network (internet). Darterminal runs protocols specific to Dartmouth's Kiewit network and will not run elsewhere without substantial work. It provides:

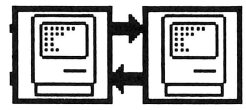
- Multiple virtual terminal connections to host computers.
- Transfer of arbitrary Macintosh files to and from the host.
- Tektronix 4012 graphics emulation.

Current status: Completed (improvements continuing).

Project: SEAGATE

SEAGATE is a network "gateway" between ETHERNET and AppleTalk. It allows UNIX to provide servers for Macintosh AppleTalk applications. Complete instructions and software for building your own SEAGATE are provided. Also included is the software for an "external file system"; this lets the Macintosh use UNIX as a transparent network file server.

Current status: Completed.



Networks

Maria Code,
Data Processing
Services,
1371 Sydney Drive,
Sunnyvale, CA 94097;
(408) 735-8006

Project: Washington University Campuswide Network

Washington University is building a campuswide network capable of transmitting pictures between workstations throughout the schools of liberal arts, engineering, medicine, and six other professional schools. An important component of this plan is the establishment of a gateway between Macintoshes on an AppleTalk network and the Ethernet-based campuswide network. UltraTalk, developed by Lutzky Baird, will form the basis for the interface between the Macintosh software environment and the VMS and Ultrix operating systems in the campuswide environment.

The first application of this interface to the campuswide network will be in a genetics laboratory course offered by the Department of Biology in the spring semester of 1986. Six Macintosh computers have been programmed to support a series of genetics experiments. Communication with a VAX host through AppleTalk will provide both file server capability and mail service.

Current status: Continuing.

Contact:
Jerome Cox, Ph.D.
Chairman, Dept. of
Computer Science
Washington University
509 Bryan Hall
St. Louis, MO 63130

Project: MacDiet

A nutrient analysis system on two disks using Multiplan's linked-files option. Nutrient data on approximately 1,400 foods are included. Nutrient totals are compared to the Recommended Dietary Allowance (RDA). Energy balance can be calculated based on Basal Energy Expenditure (BEE), formulas, and actual activities. Bar graphs are available for comparison of RDA nutrients and percentages of carbohydrate, protein, and fat, as well as ideal body weight, and caloric consumption vs. expenditure.

Current status: Multiplan version complete; compiled version (not using Multiplan) available in December 1985.

Nutrition and Food Science

Special Projects
Coordinator,
Microcomputing
Program,
Drexel University,
32nd
and Chestnut Street,
Philadelphia, PA

Nutrition and Food Science

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street,
Philadelphia, PA

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd
and Chestnut Street,
Philadelphia, PA

Project: Diet Planner

This is an interactive program for people with kidney disease. It aids in the planning and evaluation of proper diet by predicting the metabolic consequences of food choices so that these choices can be compared with nutritional goals set by the physician or dietician. It handles up to six meals in the daily plan. Information about 700 foods in 14 categories is stored in the nutritional data base. The data base may be edited by the user to suit a particular ethnic or regional diet preference.

Current status: Completed.

Project: Newdiet and Prodiet

These are Multiplan programs designed to solve nutritional composition problems involving linearly additive dietary elements as well as computation of the chemical score, an index of relative protein quality.

Current status: Completed.

Philosophy

The Personal Computing
Center
1 McNutt Hall,
Dartmouth College,
Hanover, NH 03755;
(603) 646-3249

Project: Venn, a Philosophy Tutor

This program allows the student to solve syllogisms by using Venn diagrams. It offers:

- Practice with Venn diagrams on single logical sentences.
- Single-sentence inferences.
- Full syllogisms (two premises and an inference).

Venn randomly makes up syllogisms and shows them; the student represents the premises with a Venn diagram, using MacPaintlike filling of regions with patterns. The program checks the diagram, and the student indicates whether s/he believes the syllogism to be valid or invalid. The program tells the student whether s/he is correct or not. By: The Personal Computing Center - Dartmouth College

Current status: Available now. Comes with the program called Binary Trees (see "Computer Science"). **Now in Version 2.0**. Send $4 for the disk with both applications.

Photography

Special Projects Coordinator,
Microcomputing Program,
Drexel University, 32nd and
Chestnut Street,
Philadelphia, PA

Project: F/Stop Practice

A software-based drill and practice worksheet designed to test and strengthen students' understanding of the camera's f/stop scale. Worksheet features help when requested or when triggered by two consecutive incorrect responses. Similar to applications developed with the MatchMaker authoring tool.

Current status: Completed.

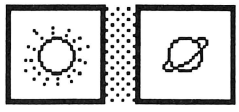
Photography

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Enlargement Tutorial

A software-based tutorial on making enlargement prints (for beginning photographers). It is designed to confront students one step at a time with the many decisions that need to be made in order to make high-quality enlargements. May be customized to reflect equipment and supplies being used. Several students can use the program at one time.

Current status: Unknown.



Physics

Project: Interference Scanning Using ThunderScan

M. Andrews and J. Sandeman, Department of Physics Australian National University

Current status: Unknown.

Project: Interface with LeCroy Fast Digitizer Through IEEE 488 Bus

M. Andrews and J. Sandeman, Department of Physics Australian National University

Current status: Unknown.

Project: Elementary Quantum Mechanics

Five programs that compute the following: transmission/reflection coefficients and energy eigenvalues for bound states (in piecewise constant potentials); energy bands and density of states (in one-dimensional, piecewise, continuous periodic lattices); energy eigenvalues in arbitrary binding potentials.

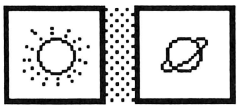
Current status: Completed, but not yet documented.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: General Teaching Applications in Physics using PASCAL Workshop

Dr. C. Edwards
Department of Physics
University of Western Australia

Current status: Unknown.



Physics

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Introductory Physics Lab

These applications include prelab interactive tutorials, data collection and analysis, curve fitting, and graphical display. They include vector addition, freefall determination of the acceleration of gravity (demo and preclass simulation), conservation of linear momentum, calorimetery (analysis in Multiplan), wave motion (standing wave simulation), simple harmonic motion and spring constant determination (linear least-squares fit calculation and graph), and the refraction of light (analysis in Multiplan and prism simulation).

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Data Acquisition Control

An application for use in the freshman physics laboratory. It analyzes, records on disk, displays, and can replay data collected during the experiment. The application communicates with a single-board FORTH-based computer (through the Macintosh's serial port). The single-board computer uses data input signals from existing lab hardware.

Current status: Completed.

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

Project: Basic Physics Applications

This series of 14 programs in basic physics is intended for use in lecture demonstrations and for individual study by students.

1. Vector One: An animated diagram that shows the viewer how to take components of a vector on a set of X-Y axes.
2. Vector Two: Illustrates the adding together of two vectors by both the graphical and component addition techniques. (The processes are fully animated.)
3. Plane One: Describes the general technique for solving mechanical problems on an inclined plane. It also illustrates the preferred coordinate system and the resolution of the forces present onto these axes.
4. Hanging One: Illustrates a typical statics problem involving a weight suspended by two ropes making arbitrary angles with a wall and a ceiling. (The resolution of all of the forces present onto appropriate axes is illustrated by animation.)
5. Shooting Ball: Shows a ball being projected vertically upward with an initial velocity. (The subsequent motion of the ball is simulated, and the potential and kinetic energies are graphed.)
6. Roller Coaster: Simulation of two-dimensional motion. This is the problem of an object undergoing roller-coaster motion. (The normal force of the track on the object is shown throughout the motion. The kinetic and potential energy functions are graphed.)
7. Momentum: Two hockey pucks collide and their motion is simulated. (The momentum function for each of the pucks is plotted.)
8. Graphing: A simple graphing routine to permit the plotting of a function of x vs. x.

9. Simple Harmonic Motion: A weight attached to a vertical spring is set into motion. (The amplitude, velocity, and acceleration of the weight are plotted as a function of time.)
10. Kinetic Gas Theory: A ball is permitted to bounce off four walls. Arrows indicating the component velocities of the ball follow its motion. (This simulation permits one to develop basic kinetic gas theory.)
11. Standing Wave: Demonstrates the principle of superpositions of waves that result in standing waves.
12. Beat Frequencies: Demonstrates the addition of two waves of nearly the same frequency resulting in "beat" frequency patterns.
13. Wave Superposition: Shows the way in which two square wave pulses interact on a string. (Constructive and destructive interferences are shown. Reflections from a rope end that is tied down, and from an open-ended rope are also shown.)
14. Ray Diagrams: Typical ray diagrams drawn for thin lenses and spherical mirrors.

Current status: Completed.

Project: Elementary Particle Theory

Four programs (of a total of eight) have been developed by Prof. Savas Dimopoulos for a physics series on elementary particle theory and on symmetrics and Lagrangians.

Current status: Completed and continuing.

Project: Freshman Physics Lab.

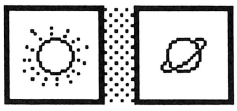
A set of data-acquisition tools is being developed for the freshman physics lab. The hardware will be partially based on the Reed College DeskTop hardware. Experiments to be performed include nuclear scintillation, Cavendish experiment, forced harmonic oscillations, and waveform synthesis.

Current status: Under development.

Project: Physics Simulations

A series of simulations (based on rapid animation) have been devised for the Macintosh to enable students to acquire an intuitive but accurate understanding of physical phenomena by exploring simulated environments without inappropriate or tedious calculations. The programs include the following topics: atomic theory, diffraction, electrostatics, harmonic motion, magnetism, monopoles, orbital physics, projectile motion, quantum mechanics, radiation, and special relativity.

Current status: Completed



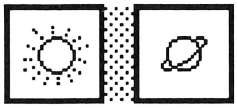
Physics

Special Projects Coordinator, Microcomputing Program, Drexel University, 32nd and Chestnut Street, Philadelphia, PA

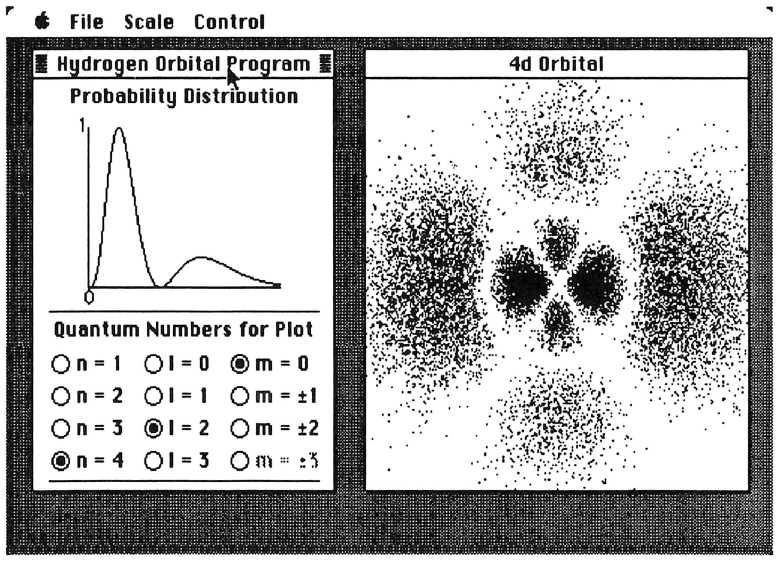
Maria Code, Data Processing Services, 1371 Sydney Drive, Sunnyvale, CA 94097; (408) 735-8006

Craig McGowan Computer Center University of Rochester 727 Elmwood Avenue Rochester, NY 14620

Professor Blas Cabrera, Department of Physics Stanford University, Stanford, CA



Physics



Psychology

Marianne Colgrove
Education & Documentation Coordinator
Development Lab
Reed College
Portland, OR 97202
(503) 771-1112, ext. 277

Project : Psychology Operant Laboratory Applications

In the Psychology Department Operant laboratory at Reed College two programs have been developed for running experiments. First is an application that randomly shuffles a set of character strings, presents then ont he screen and waits for the subject to select one of the buttons present on the screen. The Mac records which string was presented, which button was pressed and the time delay between these events. These data make the program useful for a variety of psychological tests from reaction time studies to typical personality or mood tests.

The second application uses the BenchTop Instrument to digitally control a Akinner box for experiments in operant psychology. The BenchTop Instrument, which has been customized with digital circuitry for controling relays, is serially connected to the Macintosh. A BASIC program running on the Mac controls the experimental chambers and collects the data, which can then be saved on the disk for further analysis. Currently this program is being converted to Rascal, which will make the program significantly faster, therefore allowing much shorter intertrial intervals, and will enable much quicker serial port handling. The speed of the Mac means that extremely complex operant schedules can be used that otherwise would be impossible.

Project: Stimuli for Recognition Memory Experiments

In 1980, Snodgrass and Vanderwart published norms for 260 line drawings. Each drawing is rated on name agreement, image agreement, familiarity, and visual complexity. These stimuli have been digitized and stored in MacPaint format for easy use in memory experiments.
By: Dave Lane—Rice University

Current status: Completed. **Price: $15 for two disks, payable to Rice University Psychology Department.**

Project: Three Products

Machine Language Library for Use in Psychology Experiments
Microsoft BASIC allows programmers to provide their own machine-language libraries to supplement the BASIC language. This library will contain a series of routines designed to be used in psychology experiments. Currently, there are programs to do the following:

- Shuffle an array of integers quickly (6,000 or so in a second). This is useful for sampling without replacement.
- Black out the entire screen.
- Present a series of stimuli tachistoscopically and record reaction time.

One program under development will allow the sound drive to be used in dual-task and reaction-time experiments, particularly investigating Fitt's Law.

Demonstration Experiments in Psychology
Microsoft BASIC programs (with the occasional use of machine-language routines for tachistoscopic presentation and timing of responses) are being developed to demonstrate classical findings in experimental psychology. Iconic memory, lexical decision, memory scanning (using the additive factors approach), memory span, and recognition memory can be demonstrated.

Geometrically Rotated text

Current status: Completed. Purchase price—all three disks for $15. Make checks payable to Rice University Psychology Department.

Project: MacLaboratory for Psychology

This application converts the Macintosh into a piece of usable research apparatus. Individual programs provide students with an array of tools for use throughout the psychology curriculum. Students may use these tools to carry out research experiments of their own design at both introductory and more advanced levels. Tools already developed or under development are in the area of cognitive psychology (recognition and recall, Sternberg tasks, signal detection,

Psychology

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Psychology

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and problem solving); perception and motor skills (vigilance tasks and motor factors such as mirror tracing, reaction time, and pursuit rotor); social psychology (effect of group size on problem-solving tasks); psychophysiology (detection of deception and polygraph simulation); neuropsychology (lateralization, structure, and function of the central nervous system); psychophysics (auditory and visual thresholds and iconic memory); and learning (operant and classical conditioning). In the future, tools will be developed for use in experiments in clinical counseling, tests and measurement, and industrial/organizational psychology.

Current status: Some completed; others by June 1986.

Project: Mac Laboratory Interfaces

Professor Allan Wagner,
Yale University,
c/o Box 220
Yale Station,
New Haven, CT 06520

Psychology Professor Allan Wagner of Yale University is shepherding a range of "Mactivities" in his animal learning lab. He is currently investigating the TAURUS system with MACQUISITION, a product of Small Business Computers of New England. A number of simple experiments have been simulated with the system so far. It is being adopted for use in an undergraduate lab course in animal learning. The system will be used initially to collect and display records of rat behavior. The experimenter, in spreadsheet template fashion, can assign both analog and binary channels for data acquisition, transmission, conversion, and triggering.

Current status: Continuing. **Version 1.2 available. Version 2 in January/February 1986.**

Project: Experimentation Package for Human Information Processing Research

**Salvador Algarabel
Universidad de Valencia
(Spain)
Facultad de Psicologia
Blasco Ibanel, 21
46010 Valencia
Spain
(96) 3694850, ext.
213**

This program allows the experimenter in the field of experimental psychology to carry out sophisticated research in the study of human information capabilities. This package is a modular system that gives the user the opportunity to select verbal or pictorial stimuli as input. In the first case, a large word pool (the University of Valencia's word pool contains more than 10,000 words) will be interfaced to the program, allowing selection of material according to criteria such as frequency of occurrence, concreteness, imagery, and so forth. In the second case, images created with programs such as MacPaint or read with devices such as ThunderScan will be the stimuli presented to the subject. The stimuli presentation routine allows the user to specify the number of tachistoscope fields and synchronizes stimulus display and time measurement. Finally, data will be stored in several different formats or be transferred to other sophisticated statistical programs for mathematical analysis.

Current status: **First version will be completed in spring 1986.**

Psychology

Timothy Schallert
University of Texas
Austin, TX 78712

Project: Biopsychology

This project supports a new undergraduate laboratory course in biopsychology. Microcomputers interfaced with existing equipment in laboratories allow students hands-on learning of current methods of research. Students are able to creatively interact with an ongoing experiment, and carry out procedures and assimilate information in ways that otherwise would not be possible. A specific interest area is spatial mapping. The Macintosh mouse and MacPaint software will be used to track and record animal behaviors in an arena under different conditions of thermal and neuroendocrine manipulation. The exact paths of animals will be visible to students, who can then plot heading errors, distance and speed of travel, and other relevant movements.

Current status: **Completed.**

Sociology

The Personal
Computing Center
1 McNutt Hall,
Dartmouth College,
Hanover, NH 03755;
(603) 646-3249

Project: SocStat: A Program to Compute Sociological Statistics

SocStat is a sociology laboratory on a Macintosh. It uses data sets from actual sociological surveys and allows the student to do elementary statistical analyses on them. Each data set (six are currently available) consists of up to 2,000 observations on up to 10 variables; each variable may have any of several values (different responses by the subjects of the survey).

The student can select a data set and perform a set of analyses on it: absolute or relative frequency tabulations, cross-tabulations (with dependent, independent, and possible control variables), Yule's Q and Gamma tests, and chi-square tests.

The results of each analysis appear in a window, along with the specifications for that analysis. Many windows can be created. Any window can be printed. The disk includes SOCSTAT (the program) and six data sets: social norms, stratification, social deviance, small groups, group influence, and marriage roles.
By: The Personal Computing Center—Dartmouth College

Current status: Completed. In Version 1.2 currently (will be in Version 2.0 in January/February 1986). Send $4 for the disk.

Telecommunications

Andrea Martin, ICSA -
Rice University,
Houston, TX 77251;
(713) 527-4965

Metaresearch, Inc.,
1100 SE Woodward,
Portland, OR;
(503) 232-1712

Project: Kermit

Developed by: Andrea Martin—Rice University
Kermit is a program that lets microcomputers and mainframe computers communicate and transfer files safely. This implementation uses a standard Macintosh interface, supports server mode, and allows you to change the start of header character and various communications settings. It will also allow you to send full applications as well as text-only documents and supports 8th-bit prefixing.

Current status: Currently on hold.

Project: GriffinTerminal

GriffinTerminal was developed at Reed College. It is a Tektronix 4012 terminal emulator with complete graphics-animation capabilities. GriffinTerminal can transfer text and graphics files with easy, menu-selectable commands at baud rates of up to 38.4K. We typically use GriffinTerminal for communicating between our Macintoshes and a mainframe with a UNIX operating system, but we have also found it to be very useful for downloading code to external laboratory computers and devices for data collection and appliance control. GriffinTerminal now has QuickDraw capability and mouse interrogation routines.

Current status: Completed. Consortium price: $45. Retail price: $89.

Project: Macintosh Kermit

The Columbia University Center for Computing Activities has finally completed a Kermit program for the Macintosh. MacKermit provides file transfer and terminal emulation for the Macintosh and Macintosh XL computers, allowing them to communicate with a large and diverse collection of mainframes, minicomputers, and microcomputers.

MacKermit emulates the DEC VT100 and VT102 terminals at speeds up to 9,600 baud, and includes features sufficient to allow it to work with the EMACS video display editor on various DEC-20, VAX VMS, and UNIX systems, and with IBM mainframes via either ASCII TTY connections or through 3270 protocol emulators such as Series/1, 7171, or 4994 front ends. A keyboard configurer is included, allowing definition or relocation of control, meta, and function keys.

Macintosh Kermit is based upon C-Kermit and shares the common protocol modules with UNIX Kermit version 4. It incorporates the entire Kermit bag of tricks, including three block-check options; 8th-bit prefixing for passing 8-bit binary data through a 7-bit communication channel; compression of repeated data bytes; file transfer interruption per file and group; file name collision avoidance; time-outs; server operation; and a range of protocol, file, and communications option settings that can be saved in a MacKermit

startup file along with any keyboard redefinitions. MacKermit should be able to successfully transfer files with any of the other 100 or more other systems for which Kermit programs have been written to date.

MacKermit employs the standard Macintosh user interface. It transfers both text and binary files, but it does not do any special format conversion. For instance, it will not send a MacWrite document to a foreign system as plain text (but MacWrite documents saved as text only may be sent to a foreign system in useful form). Plain text files brought from foreign systems may be used by most Macintosh applications; usually, the application will offer to "convert" such files for you.

Macintosh Kermit is built on a UNIX system using the Stanford University Medical Center SUMACC cross-development tools and is distributed in source and "binhex" form on the Columbia University Kermit distribution tapes.

Current status: **Available through Kermit Distribution (212) 280-3703.**

Telecommunications

Project: OWLNET

OWLNET involves connecting Macintoshes and IBM PCs to a 4341 running on the VM operating system to enable electronic mail and high-quality printing. A program was written that translates MacWrite files to SCRIPT files on the mainframe. It translates WordStar files as well.

For your information only. No contact available.

Current status: Unknown.

Project: SEAGate

The Stanford Ethernet—AppleTalk Gateway (SEAGate) is being implemented.

Craig McGowan
Computer Center
University of Rochester
727 Elmwood Avenue
Rochester, NY 14620

Current status: **Under development.**

Project: MacShell—A Sophisticated Terminal to UNIX

MacShell aims to provide a sophisticated multiwindow interface to the UNIX operating system. Features to be implemented include independently scrolling windows dedicated to background processes and "System" windows such as "History" and "Jobs." Each window is capable of receiving output simultaneously without the normal jumble of interspersed characters as on a single screen. The ability to recall output that has scrolled off the window and menus of common commands are available. The product, written in C, is part of the university's honor degree.

Tim North
Department of Computer Science
University of Western Australia
Stirling Highway
Nedlands 6009
Western Australia

Current status: **Expected to be finished in late 1985.**

Telecommunications

Marianne Colgrove
Education and
Documentation
Coordinator
Development Lab
Reed College
Portland, OR 97202

Project: LaserTerminal: Serial-to-AppleTalk Gateway

LaserTerminal is a program developed at Reed College that makes the Macintosh function as a gate between an RS-232 serial line (for example, from a mainframe computer) and AppleTalk, enabling LaserWriter printing of PostScript documents. LaserTerminal has a devoted line to the mainframe—a VAX 11/785—and is always "listening" for jobs destined for the LaserWriter. Output from a text processor, such as ptroff, is directed to LaserTerminal by specifying its TTY number or by using a preassigned printer name.

LaserTerminal can also be used as a simple terminal emulator for the Macintosh. In this capacity, it can receive files from a mainframe for printing on the LaserWriter or can print files that have been saved on disk. It can also save files received over the serial line for later printing or editing. If LaserTerminal discovers an error in the format while transferring a file to the LaserWriter, it will generate an error message and stop printing. The user will have to reformat the document and attempt the transfer again.

Current status: Completed

Project: GriffinTerminal 100

GT100 is available through:
Metaresearch, Inc.
1100 SE Woodward
Portland, OR 97202
(503) 232-1712

GriffinTerminal 100 (GT100), developed at Reed College, is a terminal-emulation application for the Macintosh that can function in either Tektronix 4012 or VT100 mode. Operation can be easily switched between the two modes with a menu-selectable command. Selecting either mode will change the menus to correspond with options available for each of the two terminals.

Only the control sequences that are recognized by a particular terminal will have effect when that terminal type is selected. For example, if you select VT100, then none of the graphics control codes specific to the Tek 4012 will work. In general, such operating parameters as baud rate or cursor style are shared by the two terminal types. Shared parameters can be changed via the Terminal and Settings menus.

Price: $99 (academic discounts available).

Technical Contact:
Scott Gillespie
Software Development
Manager
Development Lab
Reed College
Portland, OR 97202
(503) 771-1112, ext.
277

When in Tek 4012 mode, GT100 contains all of the features found in GriffinTerminal (which is a straight Tek 4012 terminal emulator). These features include full Tek 4012 compatibility; QuickDraw support; menu-selectable baud rates ranging from 300 to 19.2K baud; text, graphics, and hex file transfer; mouse interrogation routines; and automatic XOn/XOff handshaking.

When in VT100 mode, operation is, for the most part, identical to that of a VT100 terminal. A few parameters and operations are not supported due to the physical difference between the Macintosh and VT100 terminals.

GT100 also contains new XModem file transfer protocol, which enables the user to transfer any Macintosh file, including applications, in the standard MacTerminal style.

Current status: Completed.

Telecommunications

Project: Communications Link with Sigma Data WP Units

J. Radnell and P. Wesely-Smith
Department of Asian Studies
Australian National University

Current status: Complete.

Project: Communications Link with Epson WP Unit

J. Radnell and P. Wesely-Smith
Department of Asian Studies
Australian National University

Current status: Planned.

Project: Macintosh Videotex Terminal Emulation

K. Loane, Information Science, University of Tasmania

Current status: Unknown.

Project: MacWrite to Scribe Formatter.

David Hawkins
Computer Science
Australian National University

Current status: Completion expected in December 1985.

Word Processing

This is public domain software available from DCS, 401 URIS Hall, Cornell University, Ithaca, NY 14853

For your information only. No contact available.

For your information only. No contact available.

Richard Crandall
Reed College,
Portland, OR 97202
(503) 771- 1112 ext. 277

Project: MacWrite Translator

The translator consists of two programs that allow you to translate a document from MacWrite version 3 (RAM-based) format to that of another word processor. Using MakeTable, you can define strings that will replace MacWrite's representation of style changes and ruler settings. Once you have designed a table, you can translate any MacWrite document by using the program Translate. The result will be a text-only document containing the strings you specified (if any) before and after the text affected by the style or ruler-setting change.

Current status: Available now.

Project: MacWrite to SCRIPT Translators

Brown University, Rice University, and Cornell University are all working on this. The Rice version is run on the IBM 3033 and is designed to be used in conjunction with Kermit files uploaded from the Macintosh. Cornell is also developing a number of other MacWrite translators, including a MacWrite to WordStar translator.

Current status: Completed.

Project: PostScript Translators

PostScript is the powerful graphics language built into the LaserWriter printer. It is a procedural language that produces graphics by line and shape commands rather than by absolute pixel specifications. To allow the LaserWriter to be used with a variety of existing mainframe and minicomputer graphics packages, device drivers or "translators" must be written to perform the appropriate translations into PostScript commands. The University of Michigan is creating such an interpreter to allow a powerful mainframe graphics package, DI 3000, to be used with the LaserWriter.

Current status: Completed.

Project: GriffinText

GriffinText was developed at the Reed College MacLab. It is a fast, no-frills text processor designed specifically for academic users. Because of its simplicity and dedication to straight ASCII text, GriffinText can display, process, and print very quickly, and can easily handle large text files (up to 32K). In addition, to eliminate the problems associated with breaking a large document into several files, GriffinText has a "chainprinting" procedure that allows you to merge files into one document with continuous page numbers and with no blank spaces between files. The idea behind GriffinText is to make the process of creating and revising text as efficient as possible; embellishments are reserved for short documents and final versions.

Current status: Completed and available. Consortium price: $39. Retail price: $69.

Word Processing

Project: LaserWriter Driver for IBM PC Scientific Word Processor

Neville Smythe
Department of Mathematics
Australian National University

Current status: Unknown.

Project: Indexer for MacWrite

This project allows automatic or interactive indexing /cross- referencing/keywording.

Neville Smythe
Department of Mathematics
Australian National University

Current status: To be completed by the end of 1985.

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